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ABSTRACT

This package contains four components designed to help elementary or business education teachers teach keyboarding to elementary students. The keyboarding program described in these materials consists of three phases: Phase I--learn the keyboard, basic function keys, technique and confidence; Phase II--review the keyboard and technique, language arts application, introduction to composition and proofreading; and Phase III--quick review of keyboard and technique, creating, editing, and printing, and computer terminology. This package contains (1) an inservice guide for business teachers and elementary teachers that provides suggestions for introducing and implementing a keyboarding program; (2) a teacher's guide, with a day-by-day lesson plan for a six-week course in keyboarding that could be used in Phase I and for review; (3) Appendix A, with supplemental materials such as suggestions for implementation, sample letters to parents, visual keyboard, sample name card, activity suggestions, activity sheets, technique check list, glossary of computer terms, certificate and good work awards, and picture of a "computer bug"; and (4) Appendix B, which contains references for software, textbooks, and a bibliography of articles that relate to keyboarding. (KC)

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KEYBOARDING FOR ELEMENTARY STUDENTS

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KEYBOARDING

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KEYBOARDING

We are living in an era that will be recorded in history as "The Information Age." As with all new eras, many changes are taking place. Some are occurring so rapidly that it sometimes seems impossible to keep up with them all. John Naisbitt in Megatrends says that "We are living in the age of the parentheses--one foot in the past and one foot in the future." What is the main factor causing this change--computers! Many of the skills required of our curriculum--grammar, listening, speaking, following instructions, reading, writing, and communicating--have become increasingly important for this new age of information.

Keyboarding is often the means for effective communication. Businesses tell us that keyboarding will be a required skill for everyone. Gail Modlin, editor for business and office education at Gregg/McGraw-Hill, says "Keyboarding must be a requirement of every student in your school." Our challenge, as educators, is to ensure that the curriculum prepares the student for the future.

Keyboarding is not a term that replaces typewriting. Rather, it is the introduction of the alphanumeric keyboard. Students are ready to learn how to keyboard in elementary schools. Our project suggests several phases to help students prepare to keyboard effectively. In the Readiness Phase, K-2 teachers can help their students learn "where" the keys are located on the keyboard. In Phase I, in the third or fourth

grade, students can learn finger placement and basic techniques. In Phase II students can review finger placement but then start to develop their skill and accuracy. Language arts applications on the keyboard help the students to develop more interest in using the computer as a tool for communication. In Phase III students are ready to begin creating, editing, saving, and printing material with a word processing package.

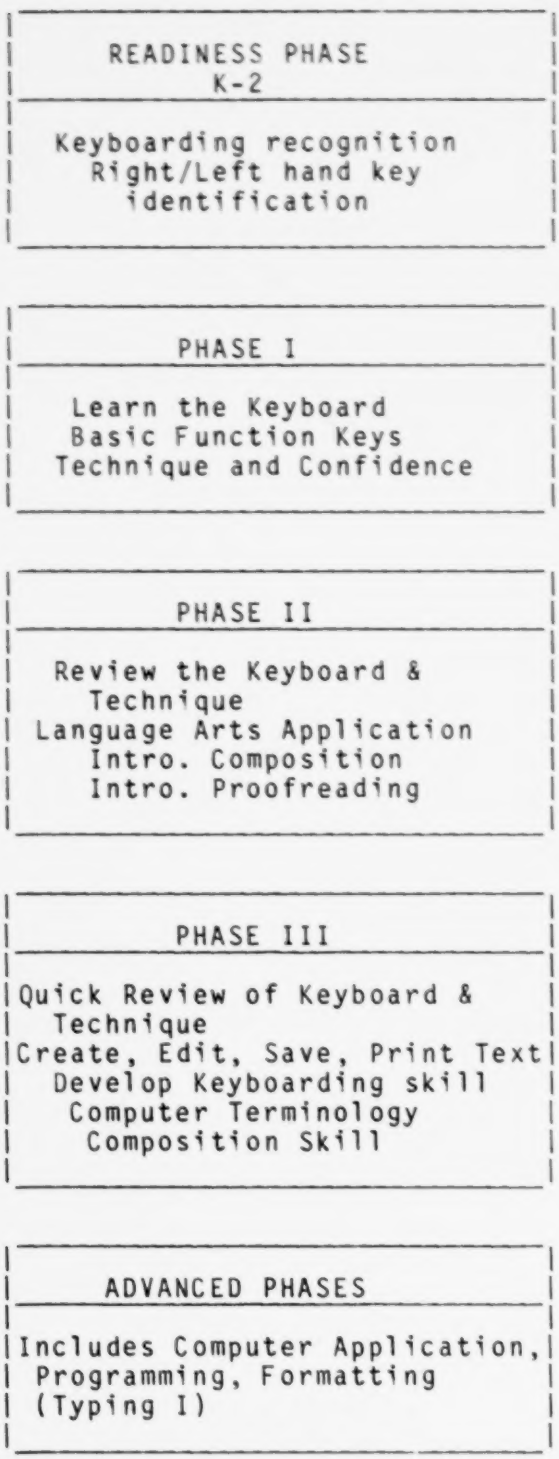
With the increasing use of the electronic keyboard in the instructional program, it will become evident that students with formal keyboarding skills can achieve more by spending less time on the input portion of their assignments.

Keyboarding is the issued addressed in this project. This project includes:

--An Inservice Guide for business teachers and elementary teachers. Keyboarding should be a cooperative effort. The guide provides suggestions for introducing and implementing a keyboarding program.
--A Teacher's Guide. This is a day-by-day lesson plan that could be used in Phase I of a keyboarding program.
--Appendix A contains supplemental materials.
--Appendix B contains references for software, textbooks and a bibliography of articles that relate to keyboarding.

Since the influence of computers on our society will continue to increase in the years ahead, we must help students prepare for this growing influence. The curriculum must be modified in such a way that students begin to learn how to become effective communicators. Keyboarding is the essential tool. Keyboarding skills are a must for every student.

KEYBOARDING PHASES



--Each phase leads into the next. Phases I, II, and III were designed for grade levels 3-7 depending on each individual school situation.

--It is important to reinforce students each year so skill is not lost and building can occur.

--It is also important that keyboarding skills be taught at a grade level prior to computer use so bad habits will not develop which would impair future skill development.

--Phase III is not the end of keyboarding. After completion of this phase, students need reinforcement and can further their skills by taking classes in Typing, Formatting, Word Processing, Computer Application, Computer Programming, etc.

COURSE OUTLINE - PHASE I

PHASE I OBJECTIVES AND PROJECTS

A. Operating the Keyboard
   1. Introduction
   2. Use of Appropriate Fingers and Techniques
   3. Alphabetic Keys
   4. Numeric Keys
   5. Symbolic Keys and 10-Key Pad
   6. Spelling, Grammar and other English Skills

B. Utilizing Computer Functions
   1. Function Keys (those you will be using in Phase I)

C. Operating the Microcomputer Hardware
   1. Introduce Microcomputer Vocabulary
   2. Discuss Computer Components
   3. Boot the System

D. Building Skill Development
   1. Use Appropriate Fingers and Techniques
   2. Develop Confidence in Keyboarding

--A day-by-day set of lesson plans are included in this packet for your use. Answers to many questions you could have regarding facilities, equipment, drills, activities, and how to get started are also addressed in this packet.

--Emphasis is placed on techniques and building the confidence of the student. Speed and accuracy are not a part of Phase I.

--All drill work is age specific. Be sure to consult the teacher of the grade of students being taught as to the vocabulary level to use.

--Drills can be found in the appendix page labeled "Activities" and throughout the day-by-day lesson plans included in this packet.

--A text is included with this packet. Feel welcome to have this text duplicated for your use. It has been designed so you can save on the cost of this project.

--The function keys that you should introduce in this phase are ones the students will need to use in this course. For example: It is better for the student to start calling the flashing box a "cursor," and the TV a "monitor."

COURSE OUTLINE - PHASE II

PHASE II OBJECTIVES AND PROJECTS

A. Review Appropriate Fingers and Techniques
   1. Alphabetic Keys
   2. Numeric keys
   3. Symbolic Keys and 10-Key Pad
   4. Computer Function Keys

B. Develop Keyboarding Skills
   1. Speed Development
      a. word/line drills
      b. speed checks
   2. Accuracy Development
      a. word/line drills
      b. speed checks
   3. Production Development
   4. Beginning Composition
      a. words
      b. phrases
   5. Langauge Arts Skills
      a. punctuation
      b. spelling
      c. sentence structure
      d. vocabulary
   6. Introduction of Proofreading Skills

--Be sure to place the highest emphasis on technique and building the confidence of the student. Speed and accuracy should not be overemphsized and should not be graded. Use of a stopwatach is not recommended.

--All drill work is age specific. Be sure to consult with the elementary/junior high teacher regarding language arts projects and vocabulary level.

--Drills can be found in any keyboarding text. Also, see the appendix page labeled "Activities" for a list of recommended drills.

--Computer terminology can be found in any computer textbook. At Phase II some basic terminology should be introduced to the students. Crossword puzzles and word-find games are fun ways to introduce these terms.

--Composition can be fun for the students. Word and phrase composition is recommended in Phase II. Sentences and paragraphs will be used in Phase III.

COURSE OUTLINE - PHASE III

PHASE III OBJECTIVES AND PROJECTS

A. Review Appropriate Fingers and Techniques

B. Text-editing or Word Processing Software Applications
   1. Use of a Variety of Text-editing/Word Processing Software Packages
   2. Create Text
   3. Edit Text
   4. Save Text
   5. Print Text

C. Developing Keyboarding Skills
   1. Speed Development
      a. word/line drills
      b. speed checks
   2. Accuracy Development
      a. word/line drills
      b. speed checks

D. Using Editing Skills
   1. Identify and Correct Errors
   2. Use Proofreaders Marks

E. Developing Knowledge of Computer Terminology

F. Developing Composition Skills
   1. Sentences
   2. Paragraphs

G. Use Keyboarding as Interdisciplinary Tool
   1. Tie in with a Class Project

--It is important not to overemphasize speed and accuracy in Phase III. Technique is most important. It is important that the students compete with themselves and not others. This phase should be a confidence builder.

--A paper can be assigned by the language arts or social studies teacher to be used in this class. The student would then write the paper, key the rough draft into the computer, proofread it, edit it, and print the final draft. This would take the student through the word processing cycle as well as provide a helpful interdisciplinary approach.

--Drill work can be found in a keyboarding text, or you may wish to refer to the page labeled "Activities" in the appendix.

--Composition at the keyboard is an important objective of Phase III. Some recommended activities in composition are given in the "Activities" section of the appendix.

--Computer terminology can be found in keyboarding and computer textbooks. Computer terminology is the language of the future and should be gradually introduced throughout the phases.

K E Y B O A R D I N G

A N

I N S E R V I C E G U I D E

FOR
BUSINESS EDUCATION TEACHERS
AND
ELEMENTARY EDUCATION TEACHERS

The 1984 Statement by the Policies Commission for Business and Economic Education states: "With the rapid expansion of Computer usage, primarily microcomputers, educational institutions should require that all students develop keyboarding skills."

One study focusing on the use of computers in elementary and secondary schools estimated that students would spend 405 hours on the microcomputers before they reach the 9th grade. From the readings available, it appears that the third and fourth grade would be an appropriate time to introduce keyboarding.

Keyboarding is not an easy subject to teach, and it cannot be taught by just anyone. Keyboarding is a cumulative skill. What can be learned or perfected at one level is heavily dependent upon what has been learned or refined at a prior level. The first exposure to keyboarding must provide the foundation for learning the proper techniques for the touch method of keyboarding. The best teaching can be accomplished by combining the business educator's knowledge of psychomotor skill development with the elementary teacher's knowledge of the learning patterns of this age student.

When beginning a keyboarding program, it is important to remember that the goals and objectives of keyboarding at the elementary level are not the same as those for the traditional typewriting class.

The primary goal should be to develop familiarization in computer keyboarding through the touch typing method following a three-phase plan:

Prior to Phase I

Students at the K-2 level can be introduced to the location of the keys on a keyboard using the index fingers. After students have learned where the keys are located, they should then learn to use the left index finger for the left half of the keyboard and the right index finger for the right half of the keyboard.

PHASE I:

A. Operating the Keyboard
--Introduction
--Appropriate fingers and techniques
--Alpha keys
--Numeric keys
--Symbolic keys and 10-key pad
--Spelling, grammar, and the language arts skills

B. Utilizing Computer Functions
--Function keys

C. Operating the Microcomputer Hardware
--Microcomputer vocabulary
--Computer components
--Boot the system

D. Skill Development
--Appropriate fingers and techniques
--Confidence in keyboarding

PHASE II:

A. Review Appropriate Fingers and Techniques

B. Develop Keyboarding Skills
--Speed development
--Accuracy development
--Production development
--Beginning composition
--Language arts skills
--Proofreading skills

PHASE III:

A. Text Editing or Word Processing
--Software applications
--Text-editing packages
--Editing skills
--Word processor
--Composition skills
--Interdisciplinary approach
--Rough draft/final draft approach
--Speed and accuracy development
--Computer terminology
--Printers

A complete listing of objectives and curriculum content can be found in "KEYBOARDING" AND "KEYBOARDING: A Teacher's Guide" which are provided in this packet for your use.

The exact grade level at which keyboarding should be introduced is not important--it will vary with each school district, equipment available, etc. What is important is that it be done early before bad habits of keystroking are established.

The elementary teacher and the secondary business education instructor must cooperatively work together to accomplish a successful keyboarding program. Realizing that individual differences will occur, the following suggestions could be adopted by each individual school. Enclosed in the appendix is a form--Suggestions for Implementing a Keyboarding Plan--that could be used in developing your keyboarding program.

I. Choosing the Instructor

A. The program could be taught using a team-teaching approach. The business education teacher understands typewriting and the elementary teacher can provide suggestions for teaching elementary students. A team-teaching approach would be ideal.

B. If time and space allow, the business teacher could be the instructor.

C. An elementary teacher could be the instructor after going through an in-service project with a business teacher.

D. A traveling teacher situation could be used.

II. Fitting Keyboarding Into Your Curriculum

It is likely that nothing will be done to teach keyboarding at the elementary level unless business educators take the initiative. Elementary teachers recognize the need for keyboarding; however, they need direction and guidance by a business teacher. Administrators may believe that there is no room in the curriculum. Students can use the computer as a tool to communicate. It is also a valuable tool to use in the teaching of reading, spelling, grammar skills, and creative writing.

A keyboarding program in language arts can:

A. Spark an interest and awareness in proper spelling, punctuation, and capitalization.

B. Help students learn organizational skills.

C. Promote interdisciplinary approaches to learning, i.e. using keyboarding skills to type a social studies report.

D. Improve writing skills.

E. Be used by students to do school work.

Keyboarding will be an important part of future written communications. Therefore, we must find room for keyboarding in the curriculum.

III. Equipment and Facility Considerations

When selecting equipment for a keyboarding course, only typewriters and computer-like keyboards should be considered. Each student should have his/her own machine. This might be all computers, all electric/electronic typewriters, or a combination of both. Manual typewriters MUST NOT BE USED. Elementary students cannot operate a manual typewriter and will learn poor keyboarding skills. They will become discouraged and upset with learning to keyboard properly.

The course should be taught wherever the most equipment is available. This might mean transferring equipment from one building to another, moving the equipment to a central location to fit the needs of

many buildings or departments, or individual departments pooling their equipment into a central location.

There are three ways in which your equipment could be organized:

A. A lab or classroom where all students are learning to keyboard at the same time.

B. While other activities are going on in the classroom or library, a group of students could be instructed in keyboarding in a computer lab.

C. Individually, students could learn the keyboard with supervision.

Most elementary school level instruction will consist of small groups of students learning to keyboard at one time. Whenever possible, each computer or typewriter should have only one student assigned to it for keyboard learning. Keyboarding skills can only be developed by having "hands on" experience on the keyboard. Students will not develop keyboarding skills simply by reading a monitor display or by listening to the instructor. Students must be actively involved.

When using large group instruction, it is recommended that the room be set up in a "u" shape. The teacher can then observe all the students' progress. A master power switch would control all machines and can be helpful in controlling the classroom atmosphere.

To be comfortable, the equipment and furniture should be at the correct height and arrangement for the student.

Avoid sending a student to a keyboard to learn it alone. It cannot be done without proper instruction and supervision.

Traditional typing supplies are not necessary (typing stands, full-size books, etc.). Materials can be leaned against the monitor.

IV. Helpful Hints for In-servicing Elementary Teachers

The following are questions often asked by elementary teachers.

A. Q. What procedure should I use?

A. "KEYBOARDING: A Teacher's Guide" will provide step-by-step daily procedures.

B. Q. How fast should I go?

A. Each class will vary depending upon the students' ages, the time of day for instruction, and other individual differences. Remember--Be enthusiastic! Be crisp and clear in your presentations.

You will soon learn to recognize when the students have reached their limits. Vocalization or body language illustrating stress will occur. It is important, however, to push them to their limits. Just relax. They will let you know if you've gone too far.

C. Q. In what order should I present the keys?

A. Although a specific order is not important, a suggested sequence is provided in the booklet, "KEYBOARDING."

D. Q. What are some activities I can use?

A. Involve the students in the drills.

Have competitive drills where the student competes with himself/herself.

Isometric exercises can be helpful in preventing or relieving tension.

Halfway through the period, have the students rotate to a different machine. (This is especially helpful when using a variety of keyboards.)

Many suggested ideas can also be found in the "Appendix of "KEYBOARDING: A Teacher's guide."

E. Q. Should I do all the lessons orally?

A. In the initial phase of learning the keyboard (Phase I), vocalization is important. The more senses used, the more the students' learning will be reinforced. For example, a teacher might say: "Let's say the keys together as we type them. Follow along in our books." When you say the keys together, keep the pace snappy but not so fast that the students can't participate.

F. Q. Is typing rhythm still important?

A. It is not important. The students will naturally develop their own typing rhythm.

G. Q. How many lines should I expect students to type in an assignment?

A. This will depend on your own situation. There are several factors to consider: amount of time in the class period, the age of the students, etc. Don't get hung up on the number of lines typed. It is more important that students are participating rather than counting the number of lines typed.

H. Q. At what grade level should keyboarding be started?

A. The keyboarding class could be offered as early as grade three. This instruction should continue each year thereafter to reinforce what the students have learned.

I. Q. How long should I spend teaching keyboarding each day?

A. A minimum of 20 minutes each day to a maximum of 40 minutes is needed. A minimum of three weeks will be required to introduce Phase I of keyboarding.

J. Q. Should I grade my students?

A. Assessment of students' progress should be continuous, but grading should not take place. If the progress must be graded, a pass/no pass system is recommended.

Students who complete the course should receive a certificate of completion. A sample certificate can be found in "KEYBOARDING: A Teacher's Guide."

Teachers may want to examine a printout or typed paper from time to time to assess the progress of students. Primary emphasis should be on stroking techniques rather than on speed and accuracy at the introductory level. A technique check list can be found in "KEYBOARDING: A Teacher's Guide."

K. Q. What else should I know about a keyboarding class?

A. --Be prepared to change activities often.

--Be creative in developing your own ideas and methods.

--Don't sit down to teach keyboarding; be a rover.

--Don't expect the student to practice on his/her own in or outside of class.

NOTE: Further examples may be found in "KEYBOARDING: A Teacher's Guide."

V. Summary

Even though many administrators may be hesitant to introduce keyboarding at the elementary level because of cost, it may be even more costly not to teach elementary students touch keyboarding. It is an essential part of each student's education. The knowledge of computers and the ability to keyboard will be required of our students. John Naisbitt writes in his book, Megatrends, "By one estimate, 75% of all jobs will involve computers in some way --and people who don't know how to use them will be at a disadvantage."

The amount of time a "two-finger" keyboarder spends at a microcomputer is significantly longer than for a person who has been taught touch keyboarding techniques.

To get maximum use of the investment in the computer equipment, formal keyboarding skills are a must for every student! It is an investment in the student's education that cannot be ignored. We must prepare students for our information society.

If you as the business instructor can't provide the instruction for these skills, we feel it is your responsibility to in-service personnel designated to instruct this course.

K E Y B O A R D I N G

--A TEACHER'S GUIDE--

PHASE I: LEARN THE KEYBOARD AND MICROCOMPUTER

WEEK 1--DAY 1

Instructor Notes:

1. All machines should be set up and turned on before students arrive. If typewriters are being used, set margins and insert paper.

*2. Have catalogs/books for students to sit on. This depends upon the age level of your students.

**3. Prepare name cards (Example in Appendix) that may be placed on top of or beside the computers, monitors, or typewriters. You cannot see name tags on students' clothes.

4. You may wish to visit with students away from the machines during the first two activities. Go to the machines for the third and following activities.

5. Establish a procedure for entering and leaving the room. Do the students turn the machines off? If so, how? Where do the books go? Papers? Name Tags? Where do catalogs go?

   In some situations, the procedure changes because the area is utilized by others. There should be time to give students directions each day.

6. If possible, makeup time should be arranged for an absent student.

7. If there is to be a rotation of students from one machine to another, inform them exactly how that will take place and when. During the session? Every day? A recommendation: Switch machines halfway through the class period or every day if computers and typewriters are being used.

8. If you have equipment without the capitalization function (Apple II Plus), tell the students that all caps will be acceptable for everything they type.

9. Be friendly, helpful, and use the students' names to develop rapport with the students.

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10. Explain why keyboarding skills are needed.

11. Define and describe keyboarding on electronic equipment.

12. Discuss and demonstrate appropriate keyboarding techniques.

13. Introduce the home row keys (a, s, d, f--j, k, l, semi) space bar, return key.

14. Practice putting hands on home row.

* Especially true with 3rd graders.
** Secondary teachers will not know their names.

Objectives and Activities:

A.1. Develop a rapport with the students--a feeling of acceptance on their part.

1.1 Introduce yourself if you are a secondary teacher/consultant.

1.2 Have students introduce themselves and tell one thing about themselves.

--Do you have a computer at home?
--Does someone you know work on a computer?
--Do you have any brothers, sisters, pets?
--Why are you taking keyboarding?

2. Describe why keyboarding skills are needed and how computers affect our everyday lives.

--That is why you are here--to learn a skill that you will use for the rest of your lives.

2.1 Used in home, business, industry

--Poster available at no charge from IBM which shows people in various life situations and positions who would use a computer.

--Compile your own pictures from magazines of people whose occupations rely upon computers and place them on a bulletin board.

--Have students find pictures of people whose occupations involve a computer and bring them to place on the bulletin board.
* Use later for composition

*2.2 Processing information manually, mechanically, electronically.

*2.3 Evolution of processing past to present (a little history).

* Use with upper-level elementary students.

3. Define and describe keyboarding on electronic equipment.

3.1 Input information on a typewriter-like keyboard using the "10-finger" or "touch-type" method.

3.2 Encourages written communication.

3.3 Easy to use if you practice keyboarding carefully and consistently.

3.4 Faster than handwriting.

3.5 Almost all computers have the same key placement on their keyboards.

3.6 Strike the keys gently and let go quickly--like touching a hot iron.

3.7 Identify and explain the monitor, disk drive, computer, and printer (if you have one).

4. Use appropriate keyboarding techniques.

4.1 Discuss and demonstrate correct posture--arm and wrist angle, hand placement, and sitting distance from the machine.

4.2 Introduce, demonstrate, and practice placing students' hands on the home row keys, the space bar, and the return key according to your text or software.

4.3 Encourage students to watch the copy from which they are typing or the monitor rather than their fingers on the keyboard. Permit visual location of the keys until students are comfortable.

4.4 Insist that students use their <u>right thumb</u> on the space bar. This is because some typewriters and computers require that the left thumb be used for another key.

4.5 Practice putting hands on the home row without looking.

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WEEK 1--DAY 2

Instructor Notes:

1. Students should switch machines halfway through the class period or each day if computers and typewriters are used.

2. Have machines turned on, paper inserted, and margins preset.

3. Introduce relaxation/finger stretch exercises for students halfway through the period. Examples:

   --Stand up by the chair, stretch, deep breath--release.
   --Shake hands with loose wrists.
   --Bend hand back toward elbow, stretching the wrist--hold it for a few seconds.
   --Intertwine fingers of both hands with palms toward you and turn quickly so that palms face away from you with arms straight.
   --Make a circle with head and neck one way--then the other way.
   --Hunch shoulders--release.
   --Yes/No exercise: Ask questions and have students respond by an exaggerated nod or shake of the head. (i.e., "Do you like spinach? ice cream?")

4. Explain progress chart (example in appendix).

5. Review the home row, space bar, and return.

6. Introduce letters "f" and "j."

7. Dictate the drills orally in a clipped, staccato manner.

8. Introduce the cursor and word "wraparound."

Objectives and Activities:

B.1. Review the home row, space bar, and return key.

   1.1 Stress anchoring the "pinkie" fingers on the "a" and "semi" keys.

   1.2 Observe placement of students' hands on the home row keys.

2. Introduce the cursor according to textbook.

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3. Introduce the "pointer (index)" finger letters "f" and "j."

   3.1 Introduce keys--Students should visually locate the keys, tap them lightly, and then turn their eyes away before drill begins.

   3.2 Teacher-directed verbal drills (say the names of the keys to be typed as you type them).
   --Eyes on copy to be typed. Students follow in the text.

   3.3 Observe students keying and suggest improved techniques, remembering the individuality of students. MOVE AROUND THE ROOM.

4. Use the space bar, right thumb, and return key with letter keys.

   4.1 Insert "space" with "f" and "j" keys.

   4.2 Practice written drill in text; dictate keystrokes while students say the keys. Follow the text.

   4.3 Call "return" at the end of dictation or each line. In order to practice the "touch method" use of the return key with the right pinkie, it is a good idea to continue immediately to the next line of dictated drill during the introduction of new keys. This will reinforce the reach with the pinkie and a quick return to the home row without hesitation.

WEEK 1--DAY 3

Instructor Notes:

1. Students should switch stations halfway through class period if computers and typewriters are being used.

2. Paper should be inserted into machines before students arrive.

3. Preset margins if necessary.

4. Continue to use the relaxation/finger stretch exercises for students halfway through the period, or even more often if you notice that the students need a break.

5. Have the students color in the stars on their progress charts, or give them a gold star, as they complete each lesson.

6. Introduce the "d" and "k" keys.

7. Introduce the "s" and "l" keys.

8. Use the "f," "j," "d," "k," space bar, and return keys.

Objectives and Activities:

C.1. Use the "d" and "k" keys.

1.1 Introduce keys.

1.2 Conduct verbal drills using the text following the method of oral dictation previously mentioned.

2. Use the "s" and "l" keys.

2.1 Introduce keys.

2.2 Conduct verbal drills.

3. Use the "f," "j," "d," "k," "s," "l," space bar, and return keys.

3.1 Conduct verbal drills.

3.2 Practice written drill; dictate keystrokes as students follow in text.

WEEK 1--DAY 4

Instructor Notes:

1. Preset margins if necessary.

2. DO NOT insert paper into machines as students will learn this today. This is not necessary when computers are being used exclusively.

3. Remember the relaxation drills.

4. Introduce the "a" and ";" keys.

5. Progress from "letter" to "word" to "sentence."

6. Begin using words that are not in the text. They may be student or teacher initiated and should as much as possible relate to subject areas that students are currently studying in language arts, social studies, computer literacy, etc. There are

examples in the Appendix to which you should add your own. Use 3x5 cards to write down these words as you or the students think of them. (They must be words that use only the fingers that have been learned up to that date.) These cards can be used each day as a change of pace for the students to review their keyboard as well as to show the students an immediate relationship between what they are learning in keyboarding and in their other classes. Keep them in your pocket or in a convenient place to pull out and use for dictation.

Objectives and Activities:

D.1. Use the "d" and "k" keys.

1.1 Use "index" key or platen knob to insert paper.

1.2 Use "paper release" lever to remove paper.

1.3 Practice once or twice.

1.4 Do not allow students to "rip" the paper from the machine. They must use the "paper release" lever. To do so incorrectly is hard on the equipment and very annoying to those around them.

2. Use the "a" and ";" keys.

2.1 Conduct verbal drills according to the text and dictated by the teacher.

*2.2 Student initiated words using only the home row.

*2.3 Conduct verbal word drills--text or teacher-made drill (refer to Activity Suggestions in the Appendix).

*Examples: "lad" "l" space "l" space "l" RETURN
(Dictate the word)

(Dictate the letters out loud as you type) "a" space "a" space "a" RETURN
"d" space "d" space "d" RETURN

(Dictate the words and the space) "lad" space "lad" space" "lad" RETURN

Follow the same procedure with the word "ask"--letter by letter; the word; then put the words together and dictate the sentence: "ask a lad" space "ask a lad" space "ask a lad" RETURN

KEYBOARDING: A Teacher's Guide

WEEK 1--DAY 5

Instructor Notes:

1. Use the text's written warmup exercises for students to practice.

2. Continue the relaxation exercises during class.

3. Continue to vary the activities; i.e., teacher dictates; students dictate together, text drills; student-initiated words; teacher-initiated words.

4. Review of the home row, space bar, and return keys.

5. Introduce the "e" key.

6. Introduce the "Visual Keyboard." Sample can be found in the Appendix.

Objectives and Activities:

E.1. Use the home row, space bar, and return keys.

1.1 Verbal drills of keys.

1.2 Distribute drill sheets for students to take home (refer to Appendix).

2. Use the "e" key.

2.1 Introduce key.

2.2 Verbal drills using simple words: use, used, etc.

2.3 Written drills according to text.

3. Distribute "Visual Keyboard."

--Demonstrate how they will be used for practice to reinforce the keys learned.
--Encourage the students to take their "Visual Keyboards" home for additional practice.
--Explain that it is better for them to use the "Visual Keyboard" than to practice on a manual typewriter.

KEYBOARDING: A Teacher's Guide

WEEK 2--DAY 1

Instructor Notes:

1. Do warmup exercises using home row keys.

2. Continue relaxation exercises.

3. Continue a variety of instructional activities and methods of instruction.

4. Introduce the "i" key.

5. Practice all keys learned.

6. Now that the home row keys are introduced, begin calling the fingers the "a" and "semi" fingers rather than the "pinkie" fingers.

Objectives and Activities:

A.1. Use the "i" key.

1.1 Introduce key.

1.2 Verbal drills of "i" key.

1.3 Written drills using home row keys and "e" and "i" keys.

1.4 Verbal drills using "e" and home row keys using simple words; i.e., "use," "used," and others in the text.

2. Practice all keys learned.

2.1 Drill practice using the text.

2.2 Observe individual students as they complete the drills using the "Technique Sheet" (example in the Appendix).

WEEK 2--DAY 2

Instructor Notes:

1. Do warmup exercises. This should be done throughout the course.

2. Continue to use varied activities and methods of instruction. This should be done throughout the course.

3. Continue to use relaxation and finger stretches. These should be continued throughout the course.

4. Introduce the "r" key.

5. Introduce the "g" key.

6. Practice all keys learned.

Objectives and Activities:

B.1. Use the "r" key.

1.1 Introduce key.

1.2 Practice written drill; dictate keystrokes as students follow in the text.

2. Use the "g" key

2.1 Introduce key.

2.2 Practice written drill; dictate keystrokes as students follow in the text.

3. Practice all keys learned.

*3.1 Verbal dictation using the text words and teacher/student initiated simple words (4- to 6-letter words rather than difficult ones.)

* Verbal dictation will continue to refer to teacher-dictated and student-dictated exercises executed in a clipped, staccato manner.

WEEK 2--DAY 3

Instructor Notes:

1. Do warmup exercises.

2. Continue to use varied activities and methods of instruction.

3. Continue to use relaxation and finger stretches.

4. Demonstrate or introduce the right shift key and the left shift key. If you have Apple IIe computers, or machines with an operating shift key function, you may want to use one day to introduce the shift keys and the next day to introduce the "." (period)

key. If you have Apple II Plus computers without the cap function, it is best at this time to merely demonstrate the use of the shift keys to a few students at a time. In the lesson for WEEK 5--DAY 1, the left shift key will be introduced to type the upper case symbols.

5. Introduce the "." (period) key.

6. Practice all keys learned.

Objectives and Activities:

C.1. Practice all keys learned.

1.1 Verbal drill using simple words in text.

*2. Demonstrate or introduce the right shift key and the left shift key.

* The shift key requires a 1-2-3 rhythm:

1 - SHIFT DOWN
2 - STRIKE LETTER "e" and RELEASE
3 - SHIFT UP

3. Use the "." (period) key.

3.1 Introduce key

3.2 Verbal drill practice.

4. Practice all keys learned.

4.1 Verbal drill using all keys learned to date.

4.2 Include shift (if appropriate), space, and return keys.

WEEK 2--DAY 4

Instructor Notes:

1. Do warmup exercises.

2. Continue to use varied activities and methods of instruction.

3. Continue to use relaxation and finger stretches.

4. Continue to transfer typing skills from letters to words using two- or three-letter words; i.e., as, add,

dad, sad, lad, and other words from your text or those you and students have selected.

5. Practice using short sentences with a period "." and RETURN.

Objectives and Activities:

D.1. Practice letters learned to date.

1.1 Distribute drill sheets to reinforce all letters learned (refer to Appendix).

1.2 Verbal practice drills.

1.3 Practice written drills in text.

2. Practice typing short, whole words.

2.1 Verbal dictation; repeat letters, then words.

2.2 Use one-, two-, or three-letter words.

2.3 Use sentences--short ones--and end with a period "." and RETURN. Remember to practice the RETURN with continuous dictation after the RETURN to reinforce a quick pivot reach with the "semi" finger and immediate return to the Home Row.

WEEK 2--DAY 5

Instructor Notes:

1. Do warmup exercises.

2. Pick up speed when you "speak together."

3. Use word families: i.e., rag, lag, Jag (abbreviation for Jaguar), sag, hag.

4. Tell the students to see if they can key one letter further. Give them longer, if necessary, so that they feel good about their accomplishments. Do not time them with a watch--just approximate the length of time (20 to 30 seconds).

5. Reinforce typing by the "Touch Method."

6. Introduce the "h" key.

7. Introduce the "u" key.

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Objectives and Activities:

E.1. Use the "h" key.

1.1 Introduce key.

1.2 Practice written drill in text.

2. Use the "u" key.

2.1 Introduce key.

2.2 Practice written drill in text.

3. Reinforce "h" and "i" keys.

3.1 Verbal dictation using simple words and word families (examples in text).

4. Practice touch typing.

*4.1 Fold paper to cover keyboard (or develop other methods of covering the keys).

*4.2 Have students type under paper.

4.3 Verbal dictation using simple words from your cards.

4.4 Have students read back from their typing; i.e., "Mary, please read the words we have just keyed."

* Use this occasionally to give the students a sense of security of keying without looking at the keyboard.

WEEK 3--DAY 1

Instructor Notes:

1. Always go back and review the keys learned. This gives the students a feeling of security.

2. Do warmup exercises.

3. Continue with the daily routine procedures.

4. Chain letters that go together and make "sense" letters (a combination of consonants and vowels; i.e., sa, se, kiki (this is a bird), and "sense" words; i.e., ask.

5. Introduce the "o" key.

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Objectives and Activities:

A.1. Reinforce typing of words

1.1 Verbal dictation of words.

2. Practice touch typing.

2.1 Fold paper to cover keys as suggested in Week 2, Day 5, 4.1.

2.2 Practice written drills in text.

3. Use the "o" key.

3.1 Introduce key.

3.2 Verbal drill.

3.3 Practice written drill in text.

4. Chain letters that go together and make "sense" letters --a combination of consonants and vowels; i.e., sa, se, kiki (a bird).

5. Practice touch typing.

6. Introduce the "o" key.

WEEK 3--DAY 2

Instructor Notes:

1. Do warmup exercises.

2. Continue usual procedures.

3. Provide computer terminology in practice exercises; i.e., Hello, Disk, For.

4. Provide a brief explanation of simple computer terminology using the Appendix and the following references:

(1) Apple Computer. The Apple Guide to Personal Computers in Education. Section 8, p 42.

(2) Minnesota Curriculum Services Center. Exploring Computers in Business. "Common Business Computer Terms."

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(3) TIES. Computer Challenge, and Quick Reference Guide.

(4) McGraw-Hill. Microcomputer Literacy Program.

5. Practice the "o" key.

6. Introduce the "t" key.

7. Introduce the "," (comma) key.

Objectives and Activities:

B.1. Practice "o" words.

1.1 Verbal drill from letters to words to sentences.

2. Use the "t" key.

2.1 Introduce key.

2.2 Verbal drill.

2.3 Practice written drill in text.

3. Practice typing computer words.

3.1 Verbal drill on words.

3.2 Emphasize that the newly learned letter "o" is NOT A ZERO. Computers will not respond to an "o" when a ZERO is required.

3.3 Emphasize that the previously learned "letter 1" (lower case L) cannot be used as the "number 1."

4. Use the "," (comma) key.

4.1 Introduce key.

4.2 Drill for location only; i.e., it is not necessary to spend a great deal of time with the comma.

WEEK 3--DAY 3

Instructor Notes:

1. Do warmup exercises.

2. Continue with the daily routine procedures.

3. Chain letters that go together and make "sense" letters.

4. Introduce the "c" key.

5. Carefully observe the fingering students use for the "c" key, using technique sheet. This is often keyed incorrectly, and you will want to catch it immediately.

6. Continue to supplement your word list with computer words that use the keys learned; i.e., If, Color, Log, Read, Cobol, Basic, Logo.

7. Continue to supplement your word list with your words, words that the students are learning in their classes, and words that are given to you as examples in this guide.

8. Practice touch typing.

Objectives and Activities:

C.1. Use the "c" key.

1.1 Introduce key.

1.2 Practice written drill in text.

2. Practice "c" words.

2.1 Verbal dictation of words.

2.2 Have students look at the ceiling or other object in the room, close their eyes, or cover their keyboard with paper while typing the dictated words.

3. Practice typing computer words.

3.1 Verbal drill on words.

WEEK 3--DAY 4

Instructor Notes:

1. Do warmup exercises.

2. Continue with daily routine procedures, changing activities often.

3. Introduce the "m" key.

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4. Practice touch typing letters and words.

Objectives and Activities:

D.1. Use the "m" key.

1.1 Verbal drill.

1.2 Practice written drills in text.

2. Practice letters and words.

2.1 Instructor and student dictation. Use student dictation for only short periods of time.

2.2 Practice written drills in text.

WEEK 3--DAY 5

Instructor Notes:

1. Do warmup exercises.

2. Continue with routine daily procedures.

3. BE CREATIVE and allow the students to be creative; i.e., use word families, computer terminology, change the word by adding "s," etc.

4. Practice letters learned to date.

5. Introduce the "w" key.

6. Practice the reach from "s" to "w" and "l" to "o."

7. Practice touch typing.

Objectives and Activities:

E.1. Practice letters learned to date.

1.1 Verbal drills.

1.2 Type letters and words.

2. Use the "w" key.

2.1 Introduce letter.

2.2 Verbal drill of "s" to "w" and "l"to "o."

2.3 Practice written drill in text.

3. Practice touch typing.

   3.1 Verbal practice using simple words.

   3.2 Verbal practice using short sentences--use the comma, the period, and the RETURN.

   3.3 Remember to reinforce the RETURN without hesitation.

WEEK 4--DAY 1

Instructor Notes:

1. Do warmup exercises.
2. Continue with daily routine procedures.
3. If you have a lab, move around the room constantly to observe the techniques of the students. Watch their thumbs so that they are bent over the space bar and not hooked beneath the computer or typewriter.
4. Introduce the "y" key.
5. Introduce the "v" and "n" key.
6. Practice touch typing.

Objectives and Activities:

A.1. Use the "y" key.

   1.1 Introduce letter.

   1.2 Verbal drill of "j"to "y" and "f" to "t."

   1.3 Practice written drills in text.

2. Use the "v" and "n" keys.

   2.1 Introduce letters.

   2.2 Conduct verbal drill using "f, t, v" and "j, y, n."

   2.3 Conduct verbal letter drills.

3. Practice touch typing.

   3.1 Conduct verbal practice using simple words; i.e., GO TO, List, Data to List.

3.2 Conduct verbal practice using short sentences (examples in text).

WEEK 4--DAY 2

Instructor Notes:

1. Do warmup exercises.

2. Practice touch typing.

3. Continue with routine daily procedures.

4. Introduce the "b" key.

5. Carefully observe the fingering students use for "b" key, using the technique sheet. This is often keyed incorrectly; correct it immediately.

6. Teach homonyms--vocabulary.

Objectives and Activities:

B.1. Practice touch typing.

1.1 Conduct verbal drills using letters of words, followed by the whole word, on letters covered to date; i.e., "d," space, "o," space, "g," dog. (Your 3x5 cards will be valuable references here.)

1.2 Dictate from written material in text.

1.3 Conduct drill using short sentences from a written source. Include the comma and period where appropriate.

2. Use the "b" key.

2.1 Introduce letter.

2.2 Verbal drill.

2.3 Drill on letters, followed by the whole word, from a written source.

3. Teach Vocabulary.

3.1 Conduct verbal drill using the words "to, too, two;" "for, fore, four;" "their, there;" "sale, sail;" "pale, pail;" etc. You have now taught them homonyms.

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WEEK 4--DAY 3

Instructor Notes:

1. Do warmup exercises.

2. Provide short drill sentences (no more than eight to ten words in the sentence). There are examples in the text.

3. Begin short speed drills (NO STOP WATCH).

4. Reinforce touch typing.

5. Teach antonyms--vocabulary.

Objectives and Activities:

C.1. Practice touch typing.

1.1 Practice drills of sentences from a written source.

1.2 Increase typing speed.

--15-second speed drills on sentences.
--30-second speed drills on sentences.
--Practice touch typing.
--Review what has been typed.

2. Teach vocabulary.

2.1 Verbal drill using antonyms; i.e., "My word is rich. Type rich. Now, what is your word?" The student will answer, "Poor." "Type poor." There are many others; i.e., short/tall; black/white, etc.

WEEK 4--DAY 4

Instructor Notes:

1. Do warmup exercises.

2. Continue with routine daily procedures.

3. Introduce the "x" and "z" keys.

4. Continue to supplement your word list. Some additional computer words are Control, Reset, Save, Load, Run, List, Then, Circle, End, Basic, Fortran.

5. Provide brief explanation of computer terminology; i.e., End means to stop a Basic program (refer to references listed in WEEK 3--DAY 2 under Instructor Notes).

6. Practice touch typing.

Objectives and Activities:

D.1. Use the "x" and "z" keys.

1.1 Introduce keys.

1.2 Verbal location drills.

1.3 Practice written drills in text.

D.2. Practice touch typing.

2.1 Conduct drill using short sentences (examples in text).

2.2 Conduct verbal drill: Dictate words a letter at a time, followed by the word; have students read back the words (examples in text).

2.3 Use computer terminology.

2.4 Use touch typing drill from a written source.

WEEK 4--DAY 5

Instructor Notes:

1. Do warmup exercises.

2. Continue with routine daily procedures.

3. Introduce the "p" and "/" (diagonal) keys.

Objectives and Activities:

E.1. Use the "p" and "/" (diagonal) keys. The diagonal key is a symbol key.
1.1 Introduce keys.
1.2 Verbal location drills

2. Practice touch typing

2.1 Conduct verbal and written drill practice of computer terminology; i.e., Start, Print, Escape,

Plot, Loop, Input, Output, Computer, Drive, Terminal, etc. Be careful to use only words that are within the reading level of the students.

3. Practice symbol key (/) according to the text.

WEEK 5--DAY 1

Instructor Notes:

1. Do warmup exercises.
2. Continue with daily procedures.
3. Introduce the Left Shift key if you have not taught it in WEEK 2 for capitalization. You will need it now for the "?".
4. Introduce the "?"; this is a symbol key.
5. Introduce the "q" key.
6. Teach synonyms--vocabulary.

Objectives and Activities:

A.1. Use the left shift key and the "?" key.

1.1 Introduce the keys.

--This is a 1-2-3 rhythmic stroke:

1 - SHIFT DOWN
2 - STRIKE "?" and RELEASE
3 - SHIFT UP

1.2 Practice for location.

2. Use the "q" key.

2.1 Introduce the key.

2.2 Verbal location drill.

3. Practice touch typing.

3.1 Verbal drill on words learned to date. This is a good time to use your cards with the words you have compiled to this point.

3.2 Drill using short sentences phrased as a question to reinforce the question mark (examples in text).

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WEEK 5--DAY 2

Instructor Notes:

1. Boot the computers with Bank Street Writer or another software disk that will allow you to place a disk in each student's drive before they arrive. The software should not require word wraparound; it should require that the student RETURN as you have been teaching and should allow them to SAVE and print immediately if you have enough printers, or allow for you to print later if you do not have printers. If you have only electric typewriters, this will not be necessary, of course. The students may want to place the compositions on the bulletin board, take them home, or both.

2. Reinforce the correct method of inserting paper into the typewriter and the correct method of removing the paper from the typewriter.

3. Practice the left shift key and the "?".

**4. Introduce "simple" composition at the keyboard. Suggestion: Have the students use as subject material the picture each one brought during WEEK 1 depicting someone using a computer or someone whose job might involve a computer. With that picture, have each student compose a "short" paragraph about that picture at the keyboard. If you have 3rd graders, the paragraph should be only three lines; with 4th and 5th graders, it could be five or six lines; with 6th, 7th, and 8th graders, it should be eight to ten lines. Since the average paragraph should be no longer than ten lines, you will be able to tell the students this, which should be excellent transfer of learning for later compositions. THIS DOES NOT INVOLVE EDITING, only beginning to compose at the keyboard. Of course, the students will have discovered very early how to correct, but this exercise is not to emphasize this. Editing is learned later in the course.

*The method you use here will depend upon the software you are using for keyboarding. Some of the software listed in Appendix B is excellent to use in this way as well as in use for drill and practice exercises for change of pace, rapid learners, and those who have missed some lessons along the way.

**If you do not have software that will allow you to SAVE and PRINT, DO NOT OMIT THIS COMPOSITION

EXERCISE!! The purpose of the exercise is to make keyboarding relevant to what they are doing in school and what they will be able to do with their keyboarding skills in the future. It is also to start them composing at the keyboard at a very early age. The SAVING and PRINTING is an added "plus" but is not necessary at this point!

Objectives and Activities:

B.1. Practice inserting paper into the typewriter using the following method:

--Use index key or platen knob to insert paper.
--Use paper release lever to remove paper.
--Do not allow students to "rip" the paper from the machine.

2. Practice the left shift key and the "?".

3. Compose at the keyboard.

3.1 Use a picture of an individual using a computer
--brought in by students during WEEK 1 and placed on bulletin board.
--brought in by instructor and placed on bulletin board.
--compiled by a media specialist into a display and used by instructor.

3.2 Teach the SAVE command. This will vary depending upon your computer. Have students save the composition under their name. Call attention to the RED LIGHT on the disk drive which tells them that the disk drive is now saving their composition on the disk. You may want to explain that the disk is round and is divided into pieces like a piece of pie. One of those pieces now has their composition saved on it. They do not need to know any more at this point.

3.3 Each student should type his/her name before beginning the paragraph.

3.4 The composition should range from three to ten lines depending upon the grade level of the student.

3.5 There is to be no emphasis upon editing.

3.6 There is to be emphasis on confidence at the keyboard. Allow the students to be creative and have fun doing this.

WEEK 5--DAY 3

Instructor Notes:

1. Do warmup exercises.
2. Introduce the hyphen key (-). This is a symbol key.
3. Introduce the backspace key. This is a function key.
4. Review the "cursor."
5. Reinforce speed. Speed drills are not to be graded or emphasized.

Objectives and Activities:

C.1. Use the hyphen key (-).

1.1 Introduce keys.

1.2 Practice location.

1.3 Practice written drills in text.

2. Use the backspace key.

2.1 Introduce key.

2.2 Discuss correction procedures on different equipment.

2.3 Practice location.

3. Use the "cursor."

3.1 Review and pair up if necessary to use the key.

3.2 Discuss forward, backward, up, and down cursor and its function.

4. Practice touch typing.

4.1 Conduct speed drills using short sentences and give 15-, 30-, 45-second timings.

4.2 Conduct one-minute timings using a practiced sentence in text.

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WEEK 5--DAY 4

Instructor Notes:

1. Do warmup exercises.

2. For observation only, provide 10-key calculator, 10-key pad of a microcomputer, or a "visual 10-key pad." (Visual 10-key pad is on the reverse side of the "visual keyboard.")

3. Teach the right shift key (if you have not already done so in WEEK 2). This is now needed for the left-hand upper case symbols.

4. Provide an explanation; when introducing symbolic keys, i.e., @ stands for each/at.

*5. Introduce the "number 1" key and the "number 2" key.

6. Introduce the #1 and #2 (upper and lower case).

7. Practice touch typing.

*If you do not have six weeks in which to teach keyboarding, you may have to teach only through the alpha keys and basic punctuation marks. This is certainly acceptable because it is the most important part of their keyboarding experience at this point.

If you find that you have completed the alpha keys and still have some time remaining, but not enough time to take only a few numbers at one time, teach all the number reaches in one day. Then teach the number keys as a home row position as suggested in WEEK 6--DAY 2, Instructor's Notes #3.

Objectives and Activities:

D.1. Use numeric keyboards.

1.1 Observe various keyboards.

--Use the 10-key pad to locate the numbers.
--Use a pocket calculator to locate the numbers.
--Use a desk calculator to locate the numbers.

2. Use the right shift key and the (!) key.

2.1 Introduce the keys.

--This is a 1-2-3 rhythmic stroke:

1 - SHIFT DOWN
2 - STRIKE "1" and RELEASE
3 - SHIFT UP

2.2 Practice for location.

3. Use the "number "1" key and the "number 2" key.

3.1 Introduce the key.

3.2 Practice the location by dictating and typing:

"aqla" space "aqla" space "aqla" RETURN

"sw2s" space "sw2s" space "sw2s" RETURN

3.3 Reinforce the difference between the "number 1" and the "letter l."

4. Use the #1 and #2 (upper and lower case).

4.1 Practice location according to written material.

4.2 Practice typing numbers and letters from written material.

5. Practice touch typing.

5.1 Verbal drill using words from text, students, or teacher.

WEEK 5--DAY 5

Instructor Notes:

1. Do warmup exercises.

2. Provide numeric keyboards for location of numbers only at this point.

3. Review #1, #2, and the hyphen (-).

4. Introduce #3 and #4 (upper and lower case).

5. Practice touch typing.

Objectives and Activities:

E.1. Review #1, #2, and the hyphen (-).

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1.1 Verbal drill.

2. Use #3 and #4 (upper and lower case)

2.1 Introduce keys.

2.2 Practice the location by dictating and typing:

"de3d" space "de3d" space "de3d" RETURN

"fr4f" space "fr4f" space "fr4f" RETURN

2.3 Practice location according to written material.

2.4 Practice typing numbers and letters from a written drill source.

3. Practice touch typing.

3.1 Conduct verbal drill using words from text, students, or teacher.

WEEK 6--DAY 1

Instructor Notes:

1. Do warmup exercises.

2. Provide numeric keyboard for location of numbers only.

3. Review #'s 1, 2, 3, 4.

4. Introduce #5 (upper and lower case).

5. Practice touch typing.

Objectives and Activities:

A.1. Review #'s 1, 2, 3, 4.

1.1 Conduct verbal drill.

2. Use #5 (upper and lower case)

2.1 Introduce key.

2.2 Practice the location by typing:

"fr5f" space "fr5f" space "fr5f" RETURN
"fr5f" space "fr5f" space "fr5f" RETURN

2.3 Practice location according to written material.

2.4 Practice typing numbers and letters from a written drill source.

3. Practice touch typing.

3.1 Practice short sentences from a written drill source.

3.2 Conduct speed drills using short sentences.

3.3 Conduct verbal drills using computer terminology; i.e., Printer, Field, etc.

WEEK 6--DAY 2

Instructor Notes:

1. Do warmup exercises.

2. Provide numeric keyboard for location of numbers only.

3. Review all numbers learned to date.

4. Introduce #6, #7, and #8.

5. Practice touch typing.

Objectives and Activities:

B.1. Review #'s 1, 2, 3, 4, 5.

1.1 Conduct verbal drill.

2. Use #6, #7, and #8 (upper and lower case).

2.1 Introduce keys.

2.2 Practice the location by typing.

"hy6h" space "hy6h" space "hy6h" RETURN
"ju7j" space "ju7j" space "ju7j" RETURN
"ki8k" space "ki8k" space "ki8k" RETURN

2.3 Practice location according to written material.

2.4 Practice typing numbers and letters from a written drill source.

3. Practice touch typing.

3.1 Practice short sentences from a written drill source.

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3.2 Speed drills using short sentences.

WEEK 6--DAY 3

Instructor Notes:

1. Do warmup exercises.
2. Provide numeric keyboard for location of numbers only.
3. Review all numbers learned.
4. Introduce #9, and #0 (upper and lower case).
5. Teach the number row as the home row.
6. Practice touch typing.

Objectives and Activities:

C.1. Review all numbers learned.

1.1 Practice written drills in text.

2. Use #9 and #0 (upper and lower case).

2.1 Introduce keys.

2.2 Reinforce the difference between the "number 0" and the "letter o."

2.3 Practice the location by typing:

"lo91" space "1091" space "lo91" RETURN
";p0;" space ";p0;" space ";p0;" RETURN

2.4 Practice location according to written material.

2.5 Practice typing numbers and letters from a written drill source.

3. Use the number row as the home row.

3.1 Introduce the number row as the home row.

--The "a" finger is anchored on the "number 1" key.
--The "semi (;) finger is anchored on the zero "(0)" key.

3.2 Practice typing numbers using material in the text or using teacher-made drills; i.e., a number quiz of 10 simple problems using all numbers.

KEYBOARDING: A Teacher's Guide

4. Practice touch typing

4.1 Drill for speed using short sentences.

WEEK 6--DAY 4

Instructor Notes:

1. Do warmup exercises.

2. Provide numeric keyboard for instruction of correct use of 10-key pad.

3. Introduce the 10-key configuration. Do not spend too much time on this. It is merely for familiarization.

4. Dictate numbers relating to programming such as 10, 20, 30, etc., and follow with the word PRINT.

5. Dictate groups of numbers and have students read back out loud for accuracy.

6. Review keyboard drill lines involving all letters by having students pace verbally together.

Objectives and Activities:

D.1. Use the 10-key pad.

1.1 Introduce the 10-key configuration.

```
        7   8   9    Subtraction
                        Bar
        4   5   6
                     Plus Bar
        1   2   3

     Zero (0)   (.) Decimal
```

--The home row is the middle row--4, 5, and 6.

--The placement of the right hand is:

*Right index finger on the 4.
*Middle finger on the 5 (There is usually an indention or a raised dot on this number so that you can always feel where that middle finger should be.)
*Ring finger on the 6.
*Pinkie finger will strike the plus and subtraction bars.
*Thumb strikes the zero (0) key.

--All reaches are made from the home row:

*Index finger reaches up to 7 and down to 1.
*Middle finger reaches up to 8 and down to 2 (also down to the double zero (00) key if there is one.)
*Ring finger reaches up to 9 and down to 3 and to the decimal (.)

1.2 Practice location on 10-key pad.

--Encourage students to take their "visual 10-key pads" home for additional practice.

2. Practice touch typing.

2.1 Give 15- to 30-second timings.

2.2 Conduct timings on short sentences.

2.3 Conduct verbal drill using numbers.

2.4 Review letters for location (alphabet word drill would be good here; refer to the Activity Sheet in Appendix A).

WEEK 6--DAY 5

Instructor Notes:

1. Do warmup exercises.

2. Introduce "Boot the System."

3. Review words learned to date using a random selection from your 3x5 cards.

4. Use short sentences incorporating the period (.), the question mark (?), and the exclamation mark at the end. Also, use the comma within some of the sentences.

5. Use a reinforcement exercise that can be a part of the student's daily routine to review the alpha-numeric keyboard. This should not take too much time from other learning areas if the students do the keying practice on their visual keyboards while you are taking enrollment, lunch count, etc.

6. Provide keyboarding certificate and letter to parents (Appendix A).

KEYBOARDING: A Teacher's Guide

Objectives and Activities:

E.1. Introduce "Boot the System."

1.1 Discuss/demonstrate care and handling of disks.

1.2 Practice putting disks in disk drives once or twice.

1.3 Practice turning machine on to "Boot the System."

1.4 Discuss/demonstrate initializing a disk.

--Reasons for initializing.
--How to initialize.

2. Practice touch typing.

2.1 Conduct verbal drill on words learned to date.

2.2 Conduct drill using short sentences phrased as a statement, a question, and an exclamation (examples in text).

3. Use reinforcement exercise to review the alpha-numeric keyboard on the "visual keyboard."

3.1 When the students arrive in the morning (or you may use any time of the day that is convenient for you), have them type in their name, address, and daily assignments written on the board. This will encourage them to use the numbers as well as the alphabet.

4. Distribute the keyboarding certificates, letter to parents, and other student materials that are to be taken home.

A P P E N D I X A

Suggestions for Implementing a Keyboarding Program
Sample Letters to Parents
VISUAL KEYBOARD
10-KEY PAD
Sample Name Card
Keyboarding Progress Chart
Activity Suggestions
Activity Sheets
Student Keyboarding Technique Check List
Glossary of Computer Terms
Certificate and Good Work Awards
Picture of "Computer Bug"

SUGGESTIONS FOR IMPLEMENTATION

STATEMENT OF WHY YOU ARE SUGGESTING KEYBOARDING

DEFINITION OF KEYBOARDING

NEED FOR KEYBOARDING

HOW COULD KEYBOARDING BE IMPLEMENTED IN YOUR DISTRICT?

- ROOMS AVAILABLE
- EQUIPMENT AVAILABLE
- WHO WOULD TEACH IT?
- WOULD STUDENTS NEED TO BE TRANSPORTED? HOW?
- TIME OF DAY
- WHERE WOULD "STUDENT TIME" COME FROM . . . i.e., from Communications, Social Studies, or ??
- OTHER DATA PERTINENT TO YOUR DISTRICT

WHAT SCHOOLS ARE PRESENTLY TEACHING KEYBOARDING IN THE STATE OR WHAT SCHOOLS IN YOUR AREA ARE TEACHING KEYBOARDING?

REINFORCEMENT OF SKILL

HOW WILL ELEMENTARY KEYBOARDING AFFECT SENIOR HIGH TYPEWRITING?

MASON CITY COMMUNITY SCHOOLS

MASON CITY HIGH SCHOOL

1700 FOURTH S. E. -:- PHONE (515) 423-4459

MASON CITY, IOWA 50401

HERBERT HOOVER SCHOOL
1123 EIGHTH N.W. PHONE (515) 423-8467

TIM WALROD
PRINCIPAL

November 21, 1984

Dear Parents,

Hoover Elementary will be piloting a new and innovative program that teaches elementary age youngsters the skills needed in proper keyboarding techniques. With the advent of computers, it will eventually be important for everyone to know how to keyboard proficiently; and, therefore, we are proud that this pilot project can be offered at our building.

"Keyboarding Instruction" has been scheduled to run for a twenty-day period from December 17 to January 16. This coincides with a time frame that allows us to have our network of computers at Hoover Elementary offering hands-on hardware experience. The class periods will run from 3:00 to 3:40 p.m. on weekdays. Nancy Moen from the Senior High Business Education Department will provide the instruction assisted by Hoover Media Specialist, Eva Otten.

Since this is a pilot (experimental) program, we must limit our group number to twenty third grade students. These volunteer participants must be able to provide their own transportation and be willing to attend all class sessions. During winter vacation, we will offer optional practice time on Thursday and Friday, December 27 and 28, from 9:00 to 10:30 a.m. We would like to invite your youngster, _____, to be a part of this project. Please consider this invitation and return the bottom portion of this letter by December 1.

This participation is entirely your choice. We will be offering other invitations after December 1 to fill our class roster to twenty students.

Please feel free to call Hoover if you have additional questions.

Sincerely,
Tim Walrod
Hoover Principal

* * * *

ORONO INDEPENDENT SCHOOL DISTRICT NO. 278
INDEPENDENCE · LONG LAKE · MAPLE PLAIN · MEDINA · MINNETONKA BEACH · ORONO
685 OLD CRYSTAL BAY ROAD
LONG LAKE, MINNESOTA 55356

JAMES E. SEITER
SUPERINTENDENT OF SCHOOLS
(612) 473-7313

W. A. FENHOLT
ASS'T. TO THE SUPERINTENDENT
(612) 473-7313

October 25, 1984

Dear Parents:

Your son/daughter has just completed a 15-hour program in keyboarding. This program was designed to teach proper keyboarding techniques and to familiarize your child with the location of the various alphabetic characters, numbers, 10-key pad, and some of the computer function keys.

We want you to be aware that the intent of this program is not to produce a proficient and productive keyboarder, but rather to help your child be more efficient in using the computer keyboard in the classes where this instruction will take place.

Next year, your student will begin using this skill when they are introduced to word processing. Skill development will continue through Grade 8, with the intention of making the student ready for the high school program. Please understand that this 15-hour program will not replace the keyboarding or typing program offered at the high school level. In fact, the high school program should enhance and build upon the knowledge your child now has and seek to make your child more productive. In the near future, everyone will need to know how to keyboard proficiently, and therefore we feel it is imperative that your student build this skill through additional exposure in the high school typing program. It will be a necessary skill of nearly every occupation as well as in our daily lives.

I have enjoyed teaching your child these past weeks, and I hope that the skill they have attained will continue to improve with continued practice, instruction and use.

Sincerely,

Patricia Headley

Patricia Headley, Chairperson
Business Education Department

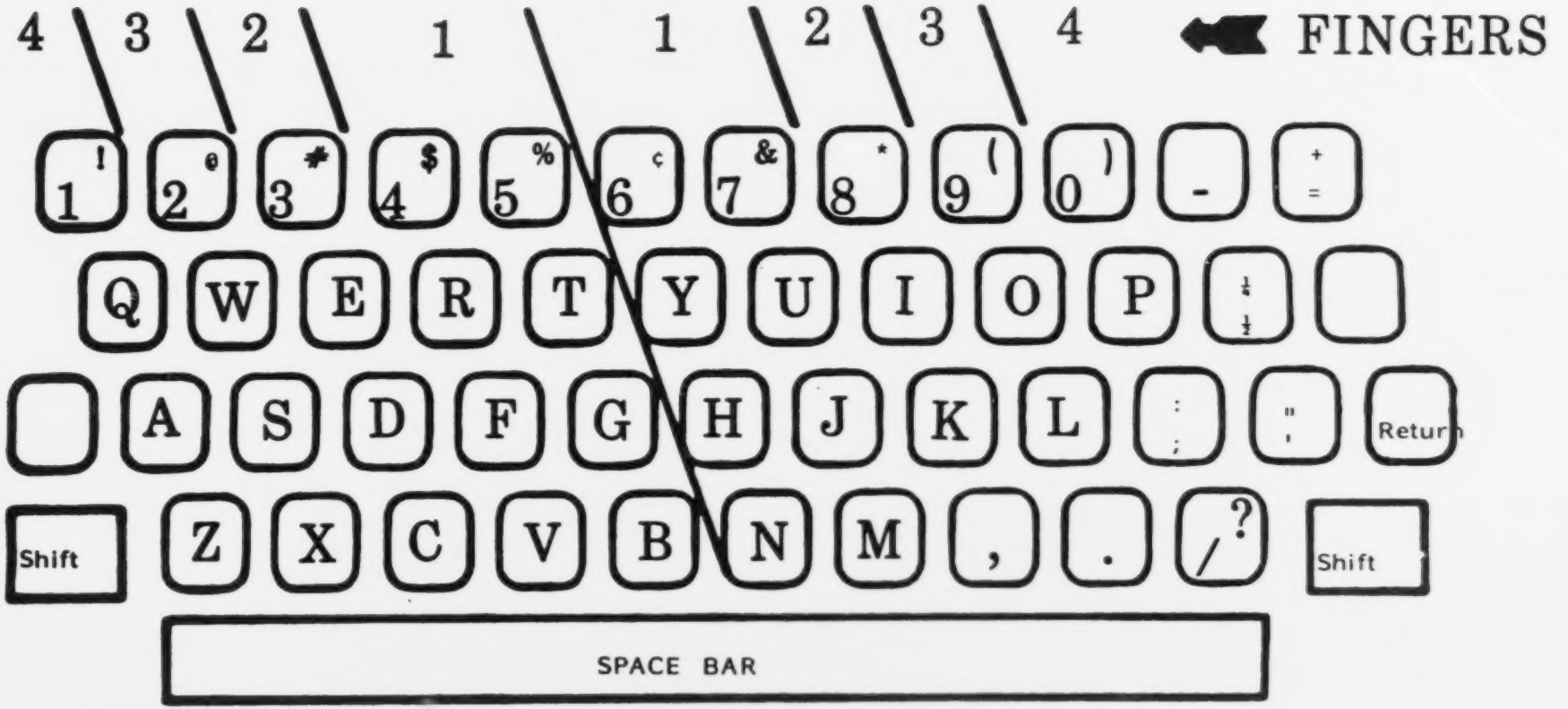
DR. K. B. WINTER
HIGH SCHOOL PRINCIPAL
473-5472

W. V. NELSON
MIDDLE SCHOOL PRINCIPAL
473-7301

MRS. MARVEL A. BONGART
ELEMENTARY SCHOOL PRINCIPAL
473-7317

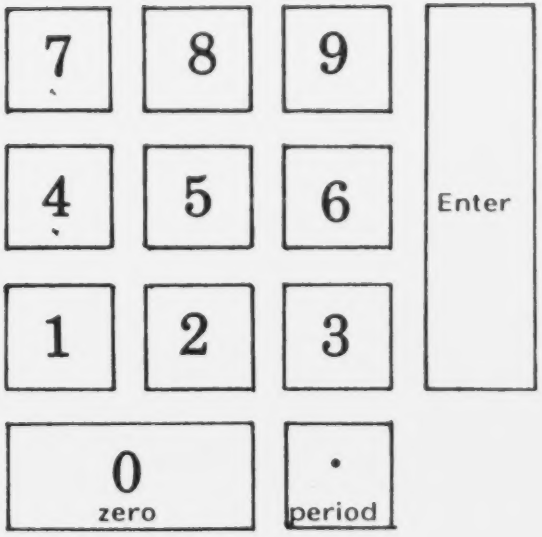
C. WAYNE SMITH
ASSOC. HIGH SCHOOL PRINCIPAL

RONALD E. GILBERT
ASSOC. MIDDLE SCHOOL PRINCIPAL



VISUAL KEYBOARD

1 0 KEY PAD



SAMPLE NAME CARD

(fold)

Print Your Name in LARGE Letters

Keyboarding Progress Chart

NAME: _____

COLOR IN THE STAR AS YOU COMPLETE EACH DAILY LESSON.

WEEK ONE

- LESSON ONE
- LESSON TWO
- LESSON THREE
- LESSON FOUR
- LESSON FIVE

WEEK TWO

- LESSON ONE
- LESSON TWO
- LESSON THREE
- LESSON FOUR
- LESSON FIVE

WEEK THREE

- LESSON ONE
- LESSON TWO
- LESSON THREE
- LESSON FOUR
- LESSON FIVE

WEEK FOUR

- LESSON ONE
- LESSON TWO
- LESSON THREE
- LESSON FOUR
- LESSON FIVE

WEEK FIVE

- LESSON ONE
- LESSON TWO
- LESSON THREE
- LESSON FOUR
- LESSON FIVE

WEEK SIX

- LESSON ONE
- LESSON TWO
- LESSON THREE
- LESSON FOUR
- LESSON FIVE

PRACTICE
EVERY
DAY!

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ACTIVITIES

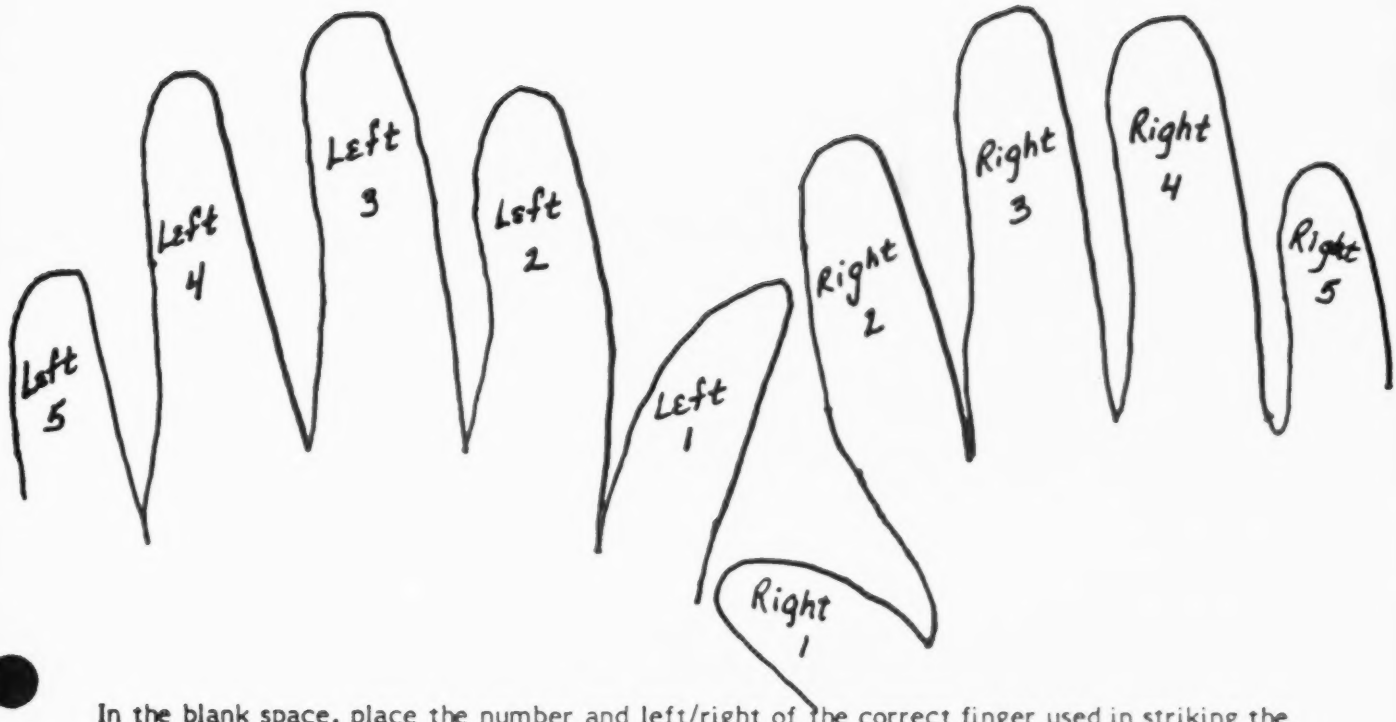
Activities help to reinforce techniques and familiarity with the keyboard. They also add fun and variety to the class.

The following are examples of activities you may wish to use in your keyboarding classroom. It is suggested that you place each activity on a card so that it can be carried into the classroom and sorted according to your preference.

PHASE OF KEYBOARDING	DESCRIPTION OF THE ACTIVITY
Readiness	Using the "MECC Friendly Computer" software disk, the "Keyboarding" and "Z-bug" programs help the student to become familiar with the location of the keys.
Readiness	Color the "Computer Bug" in Appendix A. Also use "Computer Bug" in a bulletin board idea.
Phase I	The teacher can tape a sheet of paper over the keyboard area so that the students can place their hands under the paper as they type--thus not being able to see the keys. (This should be used for only a short period of class time, from 30 seconds to 3 minutes, so that this technique is used for helping learn the keys, not frustration.)
I & II	The students can cut a picture from a magazine of a career that uses keyboarding and bring it to class for use in making a career bulletin board. (Show and Tell)
I & II	The students can type the order of the alphabet as a review of the keys and their location on the keyboard.
I & II	The students can pair up with a partner. One student is to sit at the keyboard, and the other student is to stand behind the student. The student at the keyboard types the letter called out by the teacher. The student in the back pats the left or right shoulder, depending on if the key is one that is struck by the left hand or by the right hand. Example: If the letter is "K", the front student types a "K" and the back student pats the right shoulder of the front person. This activity is used if the students get tired of sitting and need a change; it also helps the student remember which hand to use--often the f and j keys are confused as well as the d and k, the s and l, etc.

PHASE	DESCRIPTION OF THE ACTIVITY
I & II	To practice language arts skills, the teacher can give homonyms, synonyms, and antonyms. The teacher would begin by saying, "We will now type homonyms. My word is s a l e. What is your word? The students would answer, "s a i l" and then type the word sail on the keyboard.
I & II	The teacher can tell the students a list of words and the student would then type what each of the words in the list has in common.
I & II	The teacher can put a definition on the chalkboard and have the students type the word that the definition describes.
I & II	The teacher can hold up an item and have the students type words that rhyme with that item or that describe that item.
I & II	The teacher can dictate the names of students, using names containing letters that have been introduced.
I & II	The teacher can dictate high-fluency words for the students to type. Example: so, it, at, to, or, as, be, by, etc.
I & II	The students can list things that are a given color.
II	The teacher can have the students type the finish to an open-end sentence. Example: "If I had a million dollars, I would . . ."
II & III	The teacher can give the students a topic and have them type as many words as they can think of relating to this topic until you stop them. Example: Farm animals, favorite foods, names of other students in the class, flavors of ice cream, etc.
II & III	The students can compose and type a short story.
II & III	The teacher can have the students exchange seats so they can PROOFREAD each other's typed copy.
III	The students can type a paragraph describing . . . Example: The student sitting next to them; themselves; directions on how to get home.

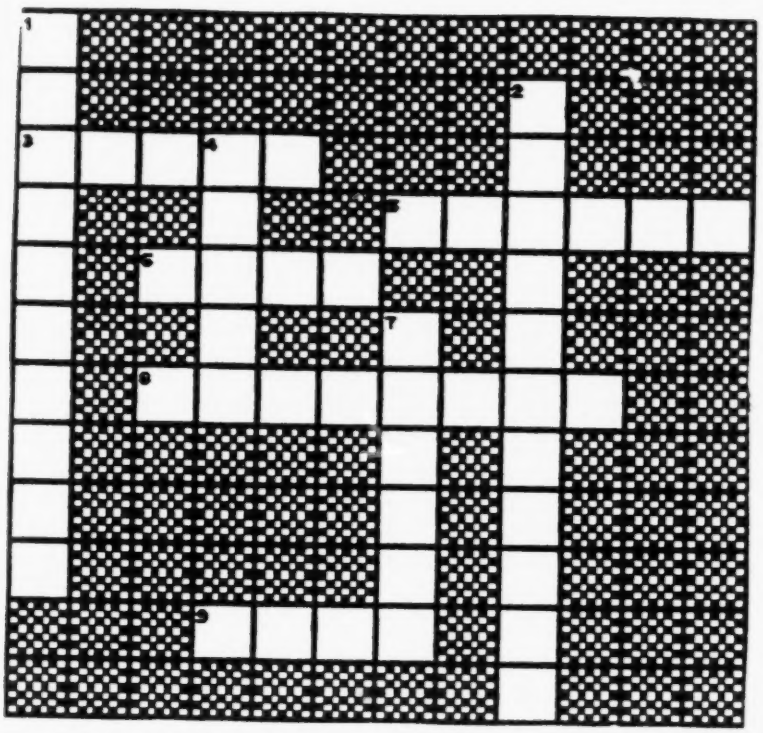
PHASE	DESCRIPTION OF THE ACTIVITY
I, II, III	The teacher can have the students use their visual keyboards to practice typing. At the beginning of each day the students can type the day, their names, the teacher's name, a few sentences from the blackboard, etc.
I, II, III	Many activities can be done using language arts skills. Be creative. a. punctuation b. capitalization c. subject/verb agreement d. abbreviations e. word/choice/vocabulary f. number expressions
I, II, III	Word Create Game Ask the first student for a letter; everyone types it. Second student gives a letter; everyone types it. Repeat until you have a word. Ask "What word did we create? Now type it." Repeat this exercise.
I, II, III	A crossword puzzle can be made using computer and keyboarding terminology. A sample is located in Appendix A.
I, II, III	If the students get restless and they need a break, the teacher can have them do isometric exercises. Example: While seated, let your arms hang by your sides. Take hold of the seat of the chair and pull up as hard as you can for 5 seconds. Have the students make "yes" and "no" movements (slowly) with their heads.
I, II, III	The teacher can have the students type words from spelling lists. Have them take their spelling test on the keyboard (if using typewriters).
I, II, III	The teacher can start a sentence and have the students add a word to the end to make the sentence complete.
I, II, III	Word Scramble. Give a list of vocabulary or spelling words with the letters out of order. The students are to type the letters in any order until they unscramble the word correctly.
I, II, III	Give the students half of a word and have them finish keyboarding the word.
I, II, III	Hand out the Drill Sheets (sample in Appendix A) for the students to type on their keyboards. They can also take the Drill Sheets home and type them on their VISUAL keyboards.



In the blank space, place the number and left/right of the correct finger used in striking the following keys.

Left 3 Example: d

_____	1.	a	_____	12.	l	_____	23.	w
_____	2.	b	_____	13.	m	_____	24.	x
_____	3.	c	_____	14.	n	_____	25.	y
_____	4.	d	_____	15.	o	_____	26.	z
_____	5.	e	_____	16.	p	_____	27.	- (hyphen)
_____	6.	f	_____	17.	q	_____	28.	/ (diagonal)
_____	7.	g	_____	18.	r	_____	29.	, (comma)
_____	8.	h	_____	19.	s	_____	30.	; (semicolon)
_____	9.	i	_____	20.	t	_____	31.	: (colon)
_____	10.	j	_____	21.	u	_____	32.	. (period)
_____	11.	k	_____	22.	v	_____	33.	? (question mark)



HOME
TYPEWRITER
PAPER
ELITE
PICA
SINGLE
DOUBLE
CENTERPOINT
KEYBOARD

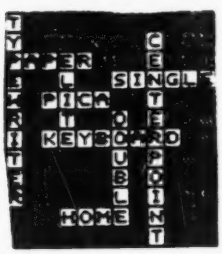
ACROSS CLUES

3. 8 1/2 BY 11 INCHES
5. NO BLANK SPACES BETWEEN TYPED LINES
6. 10 CHARACTERS PER INCH
8. WHERE ALL THE KEYS ARE LOCATED
9. YOUR FINGERS SHOULD ALWAYS BEGIN ON _____ ROW

DOWN CLUES

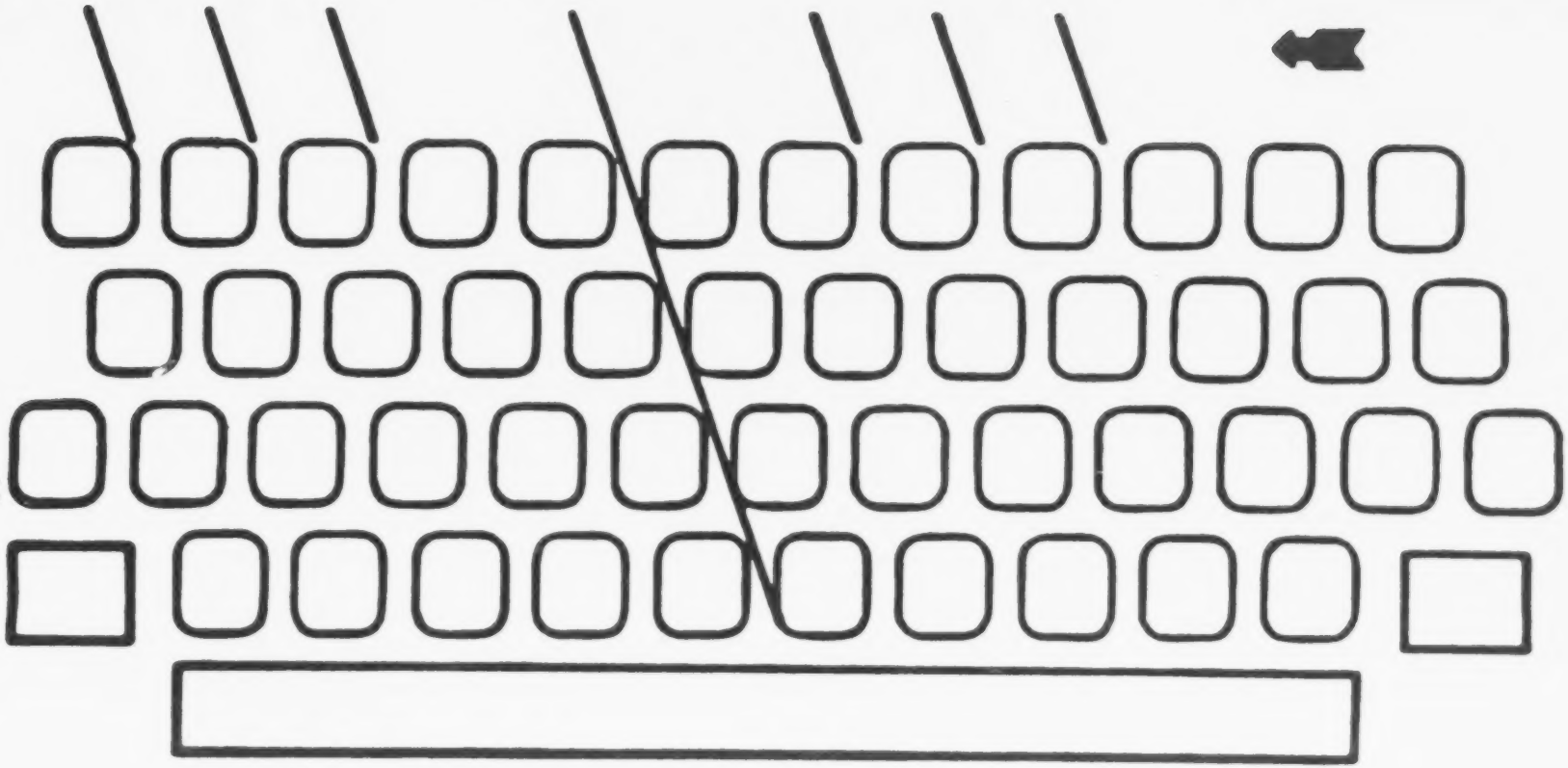
1. THE NAME OF THE MACHINE YOU TYPE ON
2. THE CENTER OF YOUR PAPER IS CALLED THE _____
4. 12 CHARACTERS PER INCH
7. _____ SPACING PROVIDES 1 BLANK SPACE BETWEEN TYPED LINES

ANSWERS: KEYBOARDING



NAME: _____

DIRECTIONS: Print the letters on the keys.



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TO: Language Arts Teacher

FROM: Keyboarding Instructor

DATE:

SUBJECT: Vocabulary/Spelling List Request

Please make a list of spelling or vocabulary words you are currently using in your class. I will be using this list in keyboarding class to reinforce what your students are currently studying.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.

19.

20.

STUDENT DRILL SHEET

(Home row, and e, period, shift, return)

1. ff jj dd kk ss ll aa ;;
2. fj dk sl a; fj dk sl a;

---

3. f fa fad fad; l la lad lad;
4. d de des desk e ee eel eel.
5. j je jel jell s sa sak sake

---

6. fad; lad; sad; sale; lake.
7. Fad; Lad; Sad; Sale; Lake.
8. sled led. led; safe. jake.
9. Sled Led. Led; Safe. Jake.

---

10. fed fed; feed jade deaf
11. fee flea flee fled fell
12. eel deal feel dell seal
13. see seal sell fake fade
14. all fall sass lass desk

---

15. sell a sled; fake a fad.
16. lead a lass; see a lake.
17. feel a jade; a sad deal.

STUDENT KEYBOARDING TECHNIQUE CHECK LIST

Student's Name_____

Date_____Class Section_____

Scoring may be by:
S or U; A,B,C,D,F;
or 1,2,3,4,5

Position Checkpoints	MARKING PERIOD 1	2	3	4	5	6
1. Head and body erect						
2. Body leaning slightly forward from hips						
3. Hips well back in chair						
4. Seated slightly to right of center of typewriter						
5. Wrists held low and level						
6. Slant of palm of hand follows slant of keyboard						
7. Arms and elbows resting close to body, shoulders relaxed						
8. Fingers curved						
9. Right thumb above space bar						
10. Feet flat on floor						
11. Seated proper distance from machines						
Machine Operation						
1. Paper inserted with twirl of cylinder knob						
2. Paper release used to release paper						
3. Light, staccato stroke						
4. Stroking smooth; carriage moving smoothly						
5. Carriage returned with flick of wrist; eyes on copy; carriage not "slammed;" hand returned immediately to keys						
6. "Hinge" motion used when shift key is needed						
7. Capitals on line of writing (shift key control)						
8. Backspace key, margin release, and tab mechanism operated by touch						
9. Correct fingering used for all keys						
10. Keying at proper letter, syllable, word, or phrase level						
Mind Set						
1. Strongly motivated toward proper technique						
2. Seeks improvement						
3. Follows directions or suggestions						

GLOSSARY*

Abacus - The first known device invented to express specific quantities.

Accessories - (Peripheral Equipment) - Extra equipment that is added to a basic computer system for greater computing capabilities; examples: game paddles and voice synthesizer.

Access - To have contact with a computer or computerized information.

Access Time - Actual time between the call for and the delivery of stored information (from input terminal to CPU to output terminal).

Acronym - A new word that is formed by combining letters from words in a phrase; example: SCUBA is the acronym for Self-Contained Underwater Breathing Apparatus.

Algebraic Logic - System of reasoning based upon mathematical relationships; uses letters and symbols to represent specific information.

Algorithm - A procedure for organizing a logical series of steps to solving a problem; strategy.

Alphanumeric - Numbers, letters, special characters, and punctuation marks as one would see on a keyboard terminal.

Analog Computer - Computing device that measures continuously and is designed to translate physical conditions like temperature, pressure, and voltage into quantities.

Analog-to-Digital System - Computer system wherein an analog computer measures and reports data to a digital device for further processing and reporting.

Analysis - Computer analysis involving data evaluation based upon Satistics (numerical facts).

Android - A human-like automated machine.

Arithmetic and Logic Unit (ALU) - A/L Unit, one of two primary components in a CPU, operated on data according to the instructions that it receives from the Control Unit.

Array - An ordering grouping; a set of variables and their values assigned space in a computer's memory.

---

* COMPUTER LITERACY-Problem Solving With Computers. Horn & Poirot, Sterling Swift Publishing Company, 7901 South IH-35, Austin, TX 78744, 1981, pp. 285-298.

Artificial Intelligence - The process of having a computer appear to "think" by simulating human intellectual activities.

Automated - A mechanical process needing minimum human assistance.

Auxiliary Storage - See Secondary Storage.

BASIC - Acronym for the computer language called Beginners All-purpose Symbolic Instruction Code; used extensively in personal computing.

Batch-Load Systems - Computers designed to process data continuously from one job to and through another with minimum human assistance.

Binary - A system based upon only two possibilities.

Binary Code - A system of code that uses two symbols, 0 (zero) and 1 (one), to represent data. Most computers are designed to handle information coded in a binary form.

Binary Digit - One of the two symbols, 0 or 1, used in a binary code.

Binary Number System - A numbering system using 0 (zero) and 1 (one) inclusively.

Arabic Numerals	Binary Code
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010

BIT - Acronym for one binary digit.

Bubble Memory - A secondary storage technique that involves microscopic areas on an electronic circuit board that have been magnetized.

Bug - Term used to describe an error in a computer program; refers to errors in human logic

Byte - A unit of information composed of consecutive bits, usually 8; one byte is treated as a single unit by a computer.

Calculator - A person or machine that performs mathematical operations.

Cathode Ray Tube (CRT) - an I/O device that is used to display input or output information; it is also called: video screen, monitor, television, display.

Central Processing Unit (CPU) - "the Heart" of the computer system where information is added, subtracted, divided, multiplied, compared, and/or sorted; "THE COMPUTER," primary parts are the control unit and the arithmetic/logic unit.

Character(s) - A number, letter, special key and/or punctuation mark on a keyboard terminal.

Charge-Coupled Device (CCD) - Secondary storage unit used to store data in electrical charges placed at specific locations on a silicon chip, volital.

Chip - See Microprocessor.

Circuit - The complete path electricity can follow including the source of the current. A computer interprets an open circuit as a zero and a closed circuit as a one.

COBOL - Acronym for COmmon Business Oriented Language; a computer language developed for business applications and used throughout the sciences.

Code - A system of symbols used to communicate.

Color Capacity - Refers to the ability of a CRT or printing device to display colors for the viewers to see.

Command - A sequence of code that instructs a computer to execute the specified instructions; there are system commands and program commands.

Common Sense - Intelligence appropriate to one's experiences and "normal" to others.

Communications Network - See Network.

Components - The various parts of a computer system including input devices, information handling equipment, and output devices; hardware.

Computations - The arithmetic operations of adding, subtracting, multiplying, and dividing.

GLOSSARY (continued)

Computer - A person or thing that computes; an electronic machine that accepts information, processes that information by carrying out mathematical operations at high rates of speed, and produces some result.

Computer Abuse - Misuse of computerized information.

Computer-Assisted - Refers to accomplishing a task with the help of computing machinery: computer assisted learning (CAL), computer-assisted design (CAD), computer-assisted manufacturing (CAM).

Computer-Generated - Produced with the aid of electronic computer; examples: electronic sounds or images, computer-generated music.

Computer Graphics - The pictures, colored shapes, dots, and lines that are "drawn" by a computer.

Computer Literacy - A general understanding of electronic computing; an area of knowledge that includes 1) an understanding of the technology used when processing information, 2) an understanding of the effects that computers have had and will have on society, and 3) an understanding of how computers are problem-solving tools.

Computer Logic - The process of determining things using arithmetic means.

Computer-Related - Having to do with computers, directly or indirectly.

"Computer Revolution" - The period of time during which electronic computers first became essential to our culture--NOW.

Computer System - A computer plus other electronic equipment working together as one unit to process data.

Computer Technology - Things, processes, and ideas associated with or using a computer.

Computerese - Computer jargon - see Jargon.

Computing - Determining things by arithmetic means called computations.

Conductor - A substance, material, body, or device that readily carries electricity by channeling it through itself.

Control Unit - One of the two primary components in a Central Processing Unit; the control unit translates computer programs and sets the order to be followed when processing specific data.

Core(s) - Magnetic cores, a common form of primary storage for large computer systems; each core in a magnetic core memory unit is an iron ring that stores one bit of magnetic data.

CRT - See Cathode Ray Tube.

Cursor - Symbol used to indicate where the next character to be input or output will be displayed on the CRT, a locator.

Cybernetic(s) - Refers to the ways in which humans and machines are similar and their relationships with one another.

DATA - Common BASIC program command that sets values and their order for assignment to variable names--see READ.

Data - Any kind of information or sets of signals that have been prepared for input or output by a computer.

Data Bank - Central location for vast quantities of computerized information.

Data Control - The protection of data from authorized and unauthorized use.

Date Preparation - Information preparation; the process of converting human language into a language that is meaningful to a computer.

Data Processing- People and machines working together to perform a series of operations for handling information (recording, reviewing, and reporting).

Debug (Debugging) - Correcting errors in a computer program; usually involves restructuring human logic.

DELETE - Some form of delete is a common BASIC system command used to remove lines of code from memory.

Device - Electronic equipment that may be interfaced to a Central Processing Unit; in general, something made to help accomplish a task.

Digital Computer - General Purpose Computer (GPC) designed to input, store, manage, and output specific units like numbers, letters, or punctuation marks.

DIM - *Common BASIC* dimension command that sets aside and assigns memory space for an array.

Disk (Disc) - Record-like disk used to store magnetic information.

Disk (Disc) Storage Units - Devices that code and read magnetic information using a stack of record-like disks and read/write heads.

Diskette - Floppy disk; basically the same as disks only much smaller and with less storage density.

Document - To furnish information; in programming, to organize a program to be easily understood including comments to clarify operations.

Dot Matrix - Small dots; a technique for presenting or printing alphanumeric characters.

Down - A computer not operational is "down."

Editing - Revising; usually associated with improving or correcting information; example: text editing.

Effector Equipment - Hardward that enables a robot to perform tasks; usually includes a mechanical hand.

Electrical Impulse - Fundamental physical phenomenon called electricity.

Electromechanical - Electrical and moving parts; the first modern computers were electromechanical.

Electron - A unit of electrical charge.

Electronics - The science of developing and applying electrical devices and systems (research, development, and applications).

Electronic Computer - See Computer.

Electronic Funds Transfer (EFT) - A computerized system for transferring credit, not money, between banking accounts belonging to different people or companies.

Electrostatically Charged Paper Copies - Technique for rapidly producing hard copies of computerized data using paper, static electricity, and dot-matrix techniques.

Equal Sign (=) - In programming, used to indicate that the contents of the variable on the left side of the sign are replaced by the quantity to the right of the sign; example: A = 22.

Execute - To accept, process, and produce the results of a computer solution to a problem; run.

END - Common BASIC program command that indicates the end of a program.

Encryption - Procedures for coding data so that it "is meaningless" while accessable to unauthorized users via communication lines.

Filmware - A new development in programming technology that allows designing and programming of software inside of the computer.

Floppy Disk - See Diskette.

Flowchart (Flowcharting) - A diagram drawn in symbols and written in a human language that represents the strategy needed for a solution to a specific problem.

Flow Lines - Lines and arrows are used to illustrate the direction data, electricity, operations, etc. are taking in a diagram or flowchart.

Format - The general organization and appearance of visual information; usually text.

FORTRAN - Acronym for FORmula TRANslation; a computer language developed to help solve scientific and engineering problems.

Fraud - See Computer Abuse.

General Purpose Computer (GPC) - A digital computer.

GOTO - Common BASIC program command used to loop; branching command.

Graphics - Refers to two-dimensional visual images; computer graphics are "drawn" by a computer (pictures, colored shapes, dots, and lines).

Hard Copy - Printout on paper of a computer solution.

Hardware - The physical equipment of a computer system; examples: keyboard terminal, CPU, line printer, or display screen.

GLOSSARY (continued)

"High-Tech" - Slang for highly-technical; refers to societies and things that rely on computer services to support the majority of activities.

Increment - Add to; count.

Information - Knowledge; data that can be coded for processing by an electronic computer.

Information Handling Equipment - The computer itself (the CPU) plus primary and secondary storage devices.

Information Technologies - The areas of specialization involved in the design, manufacturing, and sale of electronic computing devices that facilitate human communication.

INPUT - Common BASIC program command used to inform the computer to expect input of a variable value(s) by the user.

Input - Data to be accepted by the computer; an input device enables the user to give instructions and data to the computer.

Input/Output Devices - See I/O Devices.

Instruction(s) - Orders or directions; computer programs, software.

Integer - A positive or negative number that is not a fraction or a mixed number.

Integrated Circuits (IC's) - A group of connected electrical circuit elements on a chip of semiconductor material.

Interface - An electronic link between computer components that allows communications between system parts and humans.

Invertor - An electrical device similar to a switch that reverses an electrical charge.

I/O Devices (Input/Output Devices) - The parts of a computer system that are used by people to communicate with the Central Processing Unit (CPU).

Jargon - Specialized terms and phrases that are unique to the vocabulary of a group of people; example: computer jargon.

K - Stands for kilo (1,000); 1,024 bytes of information; used to describe memory system density; example: 32K.

Keyboard Terminal - Device for typing information at a typewriter-like keyboard into a computer; information is most often also displayed on a CRT while being input and/or output at a keyboard terminal.

Keypunch - Machine used to punch holes into cards that will, in turn, be read by a computer.

LET - Common BASIC program command; used when assigning value(s) to the variable name(s); optional command; example: LET A = 100 or A = 100.

Library Functions - Special mathematical functions that occur within program statements; example: square root, integer, and random number functions.

Line Numbers - Sequential set of numbers that establishes the order for coded events that must occur before a computer solution may be processed.

Line Printer - An accessory controlled by a CPU that produces printed results of a computer's operations.

LIST - Common BASIC system command that causes a listing of code in memory to be generated.

Logic - A problem-solving term tht refers to patterns for doing things in a specific order because it is reasonable to do them that way.

Logic Gates - Electronic switches that are part of a computer--see Switch

Logical Operations - Programmed actions that ask the computer to test a situation; if the test is true, something else is to occur, if false, some other action may be taken.

Loop - A series of program statements that are repeated; branching.

Machine Language - Machine-level language, typically, binary code; the only language that an electronic computer understands without first translating what was input.

Magnetic Character Recognition (MCR) Units - Input devices that "sense" special magnetic symbols on cards or paper.

Magnetic Core - See Core and Primary Storage Devices.

Magnetic Disk (Disc) - See Disk.

Magnetic Media - Input and storage media including magnetic tapes, disks, and diskettes similar to home recording tapes and records. (Binary digits are coded into magnetic lines or spots and placed on a non-magnetic surface.)

Magnetic Tape - Secondary storage technique in cassette or on reel.

GLOSSARY (continued)

Mainframe - Physically large computer with powerful computing capabilities that can control other computer systems; associated with communication networks.

Manual - Operated by hand.

Mathematical Model - Based upon numerical facts, standards, statistics.

Matrix - The format of an array that has been dimensioned in rows and columns.

Mechanical - Machine-related; principle of forces in action with motion.

Megabyte - Equal to 1,048,576 bytes.

Memory - Memory system; a computer's storage device(s) in which data can be stored and from which data can be recalled at a later time.

Microcomputer - The smallest computer system with a microprocessor Central Processing Unit (CPU); designed for single users.

Microprocessor - CHIP, a very small silicon chip (semiconductor) containing microscopic switches used to register the presence or absence of electronic information.

Microsecond - One-millionth of a second.

Millisecond - One-thousandth of a second.

Minicomputer - Mini-based system; medium sized computer designed for many users, many languages, and many I/O terminals.

Modeling - Computer modeling is the process in which an object or situation may be represented as an exact example; constructing a prototype.

Monitor - The display screen, CRT, video monitor, television.

Multi-chip - Containing more than one microprocessor.

Multiprogramming Capabilities - Ability of a computer system to store and run data necessary for several jobs at one time.

Nanosecond - One-billionth of a second.

Network - A group of communication lines that link various computer components together for large-scale computing power and sharing of information.

NEW - Common BASIC system command that clears all instructions and data from memory.

Operating System - A set of processing and control programs that provide systems security.

Operational Symbols - Mathematical symbols and parentheses are used to indicate what operations are to occur as well as their order for execution; examples: +, -, *, /, and ().

Operations - A computer performing addition, subtraction, multiplication, and division; these mathematical possibilities are manipulated so that data may be selected, analyzed, sorted, reduced, and listed as needed.

Output - The data reported by a computer; an output device enables the computer to report the results of processing data to the user.

Paper Tape - Punched paper tape; same principle as punched cards--see Punched Cards.

Peripheral Equipment - See Accessories.

Personal Computer - See Microcomputer.

Personal-Data - "Private" information about an individual's personal life.

Personal Privacy - The right of Americans to protect personal-data.

Photo-Electrical Device - Electronic device that is sensitive to light; example: photo-electrical card reading machines.

Picosecond - One-trillionth of a second (one-thousandth of a nanosecond or 10^{12} seconds).

PL 1 - Acronym for Programming Language 1.

Plotter - Special output device that records lines, letters, and graphic symbols; used by architects, engineers, and other design groups.

POS Terminal - Acronym for point-of-sales terminal; I/O device specialized to accept and report information about retail/wholesale prices, inventory, and sales.

Power Source - Refers to electrical resources; electrical outlet.

Primary Storage - Information handling devices that hold a program's instructions and data in memory during its run; examples: RAM, ROM and magnetic cores.

PRINT - Common BASIC program command that instructs the computer to print out or display data.

Printer - The most common form of output device; produces printed results of a computer's operations.

Printout - The printed results output by a computerized printing device.

Process - A series of actions; to perform a specified series of mathematical operations upon data (typically, recording, summarizing, and reporting).

Program - A plan for solving a problem that is written in a language understood by a computer; software.

Program Flowchart - Diagram of the logically ordered instructions that must be coded into a computer language before a computer solution may be processed.

Programmer - the person who writes computer programs (software).

Prompt - See Cursor.

Protected Data - Information considered to be "delicate"; examples: CIA records, criminal law enforcement agency records, and protective services records; the public has restricted access to such information.

Punched Cards - Although becoming obsolete, common way of feeding information into digital computers; holes in paper cards representing data.

RAM - Primary memory for microcomputers; semiconductor Random Access Memory.

Random - Without order, sequence or pattern.

READ - Common BASIC program command that sets variable names for the DATA values--see Data.

Real-Time - The actual time used to create computerized effects (simulations, animations, and modeling).

Registers - Components of the Central Processing Unit (CPU) that are used by the computer to receive, hold, and transfer data; example: accumulator registers, address registers, instruction registers, counters.

REM- Common BASIC program command used to indicate comments (remarks) not to be output with the solution.

Remote Terminal - An input/output device located at some distance (often miles) from the Central Processing Unit (CPU).

ROM - Primary memory for microcomputers; semiconductor Read Only Memory.

Routine - Programming routine; a sequence of code.

RUN - Common BASIC system command used to cause the program in memory to be executed.

Run - Refers to an operational computer system that is "up" or "running;" and executed computer program is called a "a run."

Save - A computer program is saved when stored by a secondary storage device like a cassette tape recorder.

Scan - To analyze data by "sensing" it; a television camera may be linked to a computer and used as a scanning device.

Screen - See Cathode Ray Tube.

Secondary Storage - Devices used to save computerized data; typically, magnetic disks, magnetic tapes and reels, bubble memory, and/or chargecoupled devices.

Semiconductor - A substance that conducts electricity better than an insulator (nonconducting) but not as well as a metal (conducting); silicon is a semiconductor.

Sensor - Automated senses; refers to electronic equipment designed "to sense" specific events and report them to a computer. Touch sensors, for example, give a robot the ability "to understand" differences in pressure, points of contact, and electrical circuits.

Sequence - Order for a series of actions, events, operations.

Simulation - Computer simulation refers to a computer being used to imitate a situation or object in a mathematically logical way.

Software - Computer programs; the coded instructions that direct the operation of computer hardware.

Solution - The act of solving a problem, answering a question, achieving a result.

Sound Capacity - Ability of a computer system to generate synthesized sounds, music; accessory devices like speakers and amplifiers are usually part of such a system.

Square Root - A computational operation wherein a number must be multiplied by itself to get the desired results.

Storage - See Memory.

Strategy - A procedure for organizing a logical series of steps to solving a problem; and algoraithm.

String Variable - A series of bits (numbers, letters, blanks, punctuation marks) grouped together and assigned to a variable name; typically, identified by the dollar sign ($); examples: A$, N$, X$.

Structure - A way of organizing, constructing, or interrelating things, actions, or thoughts.

Structured Programming - Common sense method of ordering a computer program so that it may be easily read by the programmer, the computer, and someone else.

"Suan-pan" - The Chinese abacus--see Abacus.

Subscripted Variable - Set of values or variables used when large sets of values are assigned to a single variable name; examples: A(1), A(2), A(3), A(N).

Switch - A device for opening or closing a circuit; switches in electronic circuits are called gates.

Symbol - Something used to represent something else; frequently graphic.

Syntax - In computing, refers to the structure of code within a computer program; a syntax error is an error in programming procedures.

System - An electronic computer along with other electronic equipment working together as one unit to read, process, and output data.

System Flowchart - Diagram of the series of hardware actions that must occur to process data using a specific computer system.

Systems Security - Procedures within a computer system to protect computerized data while it is being processed and/or stored.

GLOSSARY (continued)

Tabulating Machinery - Mechanical devices used to arrange numerical data, typically, in lists or tables.

Technical - Pertaining to Technology--See Technology.

"Techno-Artistic" - Refers to the process of using a computer for creative expressions like music and art.

Technology - Refers to the ways in which the people of a society provide themselves with things; associated with electronics and computing machinery; root word "techno-" is Greek meaning art.

Template - A pattern or guide.

Terminal - Electronic junction for delivery and reception of information; computer input/output device; intelligent or dumb.

Text - Copy, words, narration.

Text Processing - See Word Processing.

Time-Sharing - Technique for organizing a computer system that enables several people to use the computer at one time and "feel" as if they are the only user.

Tool - Anything used to help accomplish a task or to do work.

Tracks - Magnetic rings or lines used to store digital data onto disks, tape reels, cassettes; example: an eight track tape.

Transistor - An electronic device that uses semiconductor materials to control the flow of electrial currents; similar in function to a vacuum tube, but does not require that its elements be heated in order to generate electrons.

Up - A computer system that is operational.

User - The person who is interacting with a computer system.

Vacuum Tube - Electron tube; a sealed container that uses heat to amplify, detect, and convert electrical currents in order to generate electrons.

Values - Quantities and/or qualities that are assigned to variable names.

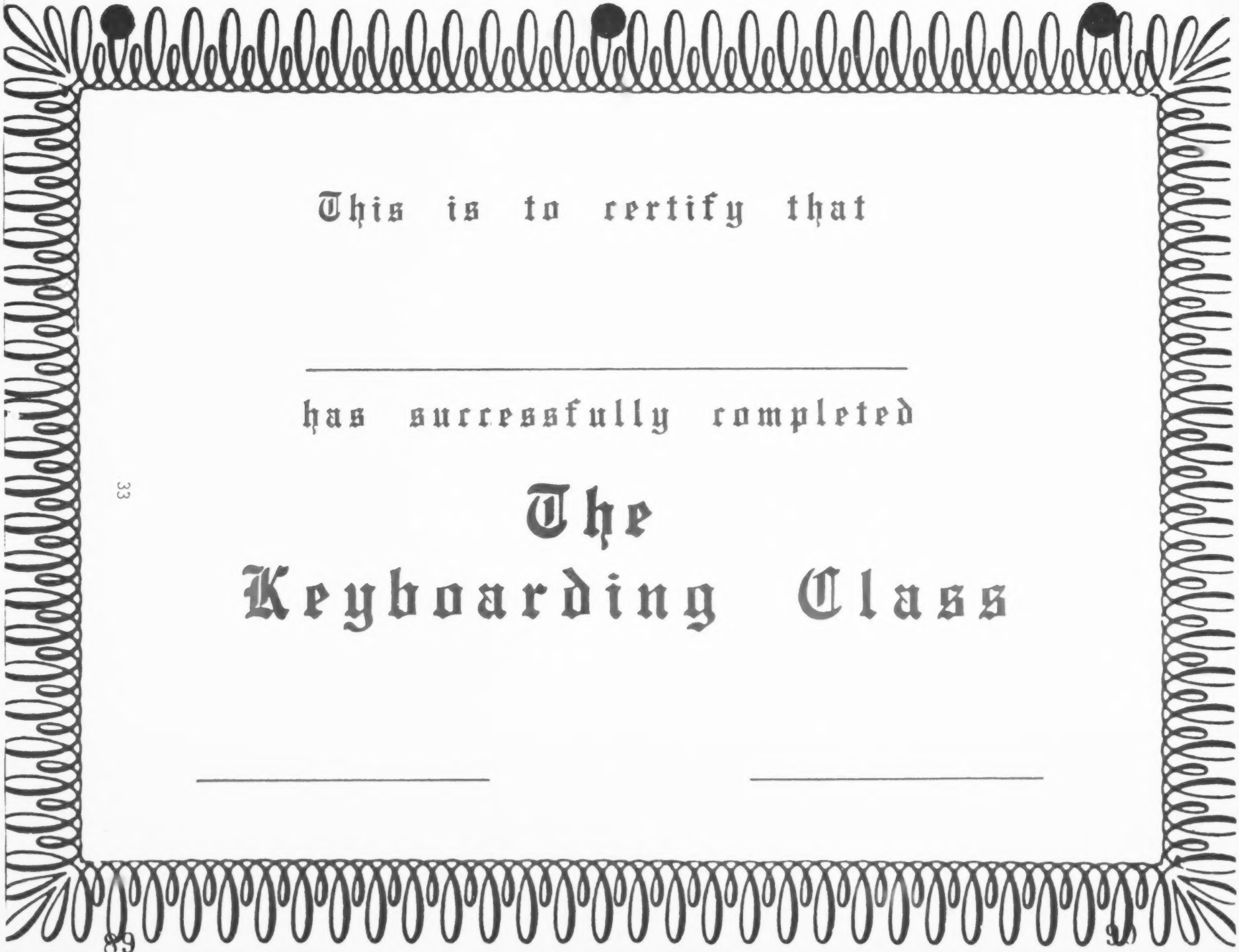
Variable - A possibility that can alter the outcome of a situation, a quantity that can alter the outcome of a computer program while it is being run.

GLOSSARY (continued)

Visual Information - Knowledge presented for interpretation using vision; must be seen.

Volital Storage Device(s) - Storage devices that lose data when the power source to the storage unit is cut off; Charge-Coupled Devices are volital storage units.

Word Processing - Computerized typing with the user being able to list, repeat, and edit text formats; text processing.



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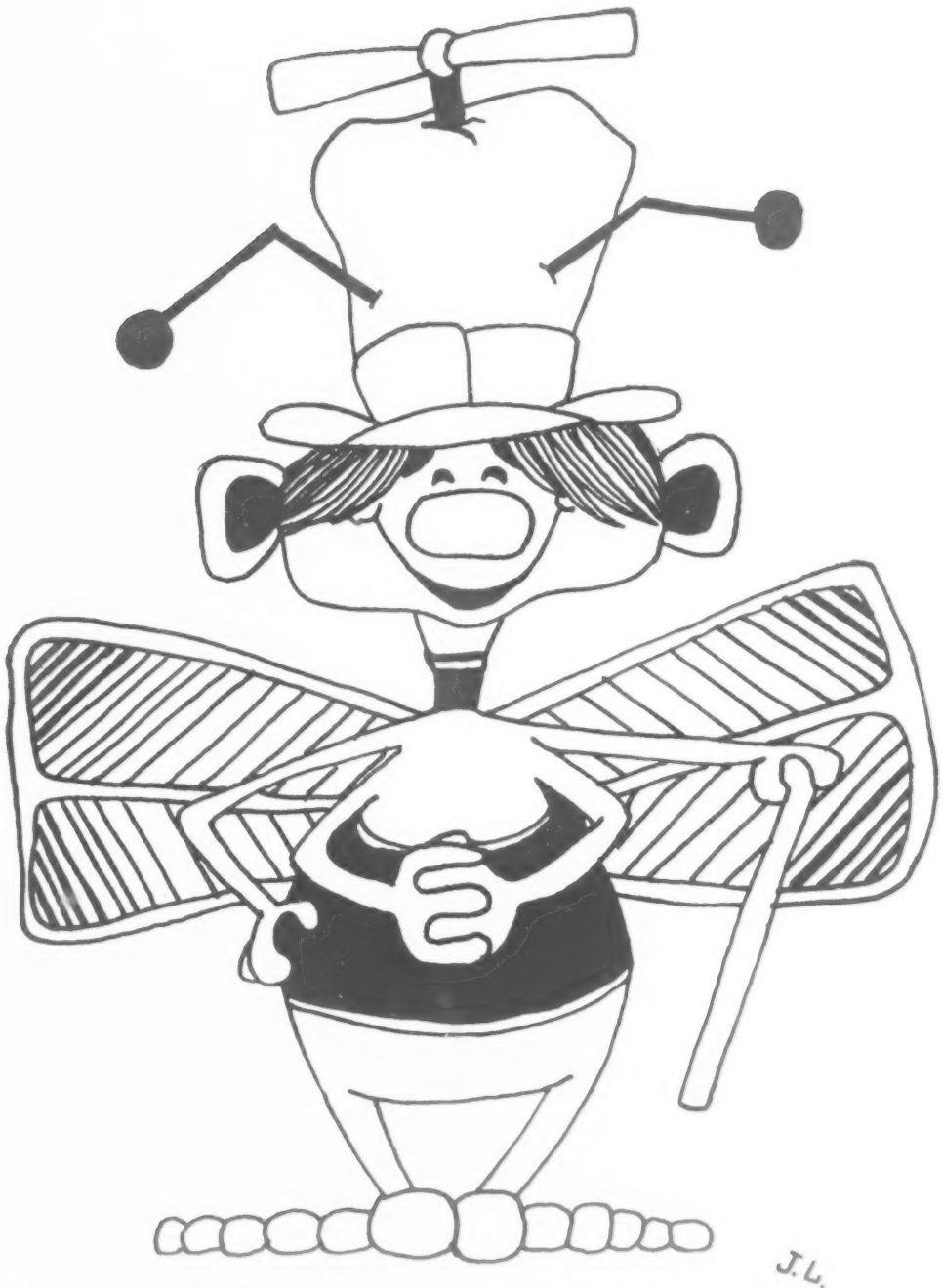
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55 S. Broadway
Tarrytown, NY 10591

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Bank Street Writer
TIES
1925 West Co. Rd. B2
St. Paul, MN 55113

Compukeys-Elementary Edition, 1985 (Apple)
Compukeys, INC.
P.O. Box 8142
St. Paul, MN 55108

Stickbear Typing (Apple)
Weekly Reader Family Software
245 Long Hill Road
Middleton, CT 06457

Just Your Type (Apple, IBM PC/jr, Commodore 64/Pet)
Right on Programs
140 East Main Street
Huntington, NY 11743

Keys to Typing (Commodore 64)
Batteries Included
30 Mural Road
Richmond Hill, Ontario
L4B 1B5 CANADA

Microcomputer Keyboarding (Apple, TRS-80, IBM)
(4 disks)
Alphabetic Keyboarding (Apple, TRS-80, IBM)
(2 disks)
The Micro-Editor (For text-editing)
Microtype: The Wonderful World of Paws (Z307-3)
(Apple, Commodore 64, IBM PCjr)
South-Western Publishing Co.
5101 Madison Road
Cincinnati, OH 45227

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Smartype--A Keyboarding Program (Apple)
Gregg Keyboarding For Information Processing
Microcomputer Key Pad Operations
(TRS-80, Apple IIe, Apple IIc, IBM PC)
Gregg/McGraw-Hill
13955 Manchester Road
Manchester, MO 63011

Typing Instructor (IBM PC/PCjr, TI, Wang, PC compatible)
Individual Software
1163-I Chess Dr.
Foster City, CA 94404

Typing Professor (Commodore 64)
Commodore
1200 Wilson Drive
West Chester, PA 19380

Typing Teacher II (Apple)
Compu-Tations
P.O. Box 502
Troy, MI 48099

Typing Tutor & Word Invaders (Atari 2, Commodore 64, Vic 20)
Academy Software
P.O. Box 6277
San Rafael, CA 94903

Friendly Computer
Z-Bug
Keyboard
Business Vol. 1 - Typing
MECCWRITER
Cook's Typing Disk
MECC
3490 Lexington Ave North
St. Paul, MN 55112

Touchtype (Apple)
Software Spirit
Alberta, Canada

Typing Tutor
Microsoft
10700 Northrup Way
Bellevue, WA 98004

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P.O. Box 8732
White Bear Lake, MN 55110

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10364 Rockingham Dr.
Sacramento, CA 95827

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230 Mt. Hermon Rd.
Suite 207
Scotts Valley, CA 95066

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230 Mt. Hermon Rd.
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New York, NY 10016

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1234 Amsterdam Avenue
New York, NY 10027

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AVKO
Educational Research Foundation, Inc.
3084 W. Willard Road
Birch Run, MI 48415

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TYPING FOR INDIVIDUAL ACHIEVEMENT / by Jack Heller
Gregg Division/McGraw Hill
13955 Manchester Road
Manchester, MO 63011

MICRO KEYBOARDING
Hopkins School District #270
Minnetonka, MN 55443

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PERSONAL TYPEWRITING (T69)
South-Western
5101 Madison Road
Cincinnati, OH 45227

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A Visual Keyboard Poster for Commodore 64 (Z9589)
South-Western
5101 Madison Road
Cincinnati, OH 45227

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Minnesota Curriculum Services Center
3554 White Bear Ave.
White Bear Lake, MN 55110

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